

APPAREL RESEARCH NETWORK (ARN) PROGRAM

Final Technical Report

Contract Number SPO100-95-D-1004/ Delivery Order 0010

QLM LOCAL ROLLOUT TO U.S. ARMY CIIPS

(Ft. Sill, Ft. Benning, Ft. Knox, Ft. Jackson)

(QLM LOCAL-ARMY)

Prepared for:

Apparel Research Network (ARN) Program
Defense Logistics Agency
17 December 2002



Prepared by:

ARN Partner
EDI Integrated Corporation (EIC)
2200 Defense Highway,
Suite 303
Crofton, MD 21114
Telephone: (301) 858-0054
Email: ediintcorp@aol.com

Sub-Contractor
AdvanTech, Inc.
2568A Riva Road
Suite 101
Annapolis, MD 21401
410-266-8000
info@advantech-inc.com

20030128 071

DISTRIBUTION STATEMENT A

Approved for Public Release
Distribution Unlimited



Table of Contents

	<u>Page</u>
PREFACE	iii
1.0 EXECUTIVE SUMMARY.....	1
1.1 OVERVIEW	1
1.2 PROJECT APPROACH	1
1.3 QLM/LOCAL ROLLOUT INSTALLATION PROCESS OVERVIEW & PROTOCOL	2
1.4 PROCESS AND SYSTEMS INTERFACE ASSESSMENT, AUTOMATE RECEIPT PROCESS	3
1.5 SYSTEM ARCHITECTURE	4
1.6 IMPLEMENTATION.....	5
1.7 SUMMARY	7
2.0 INTRODUCTION	8
2.1 OVERVIEW OF SYSTEM ARCHITECTURE	8
2.2 SCOPE OF THE PROJECT	9
2.3 SHORT TERM PROJECT OBJECTIVES.....	10
2.3.1 <i>Ft. Knox, Ft. Benning, Ft. Sill & Ft. Jackson Objectives</i>	10
2.3.2 <i>TRADOC Objectives</i>	11
2.3.3 <i>DSCP Objectives</i>	11
2.3.4 <i>DLA Objectives</i>	12
2.4 DEFINITION OF TERMS	12
3.0 SYSTEM ARCHITECTURE & OPERATIONS	14
3.1 OVERVIEW OF SYSTEM ARCHITECTURE	14
3.2 GENERAL CONCEPT OF OPERATIONS	14
4.0 CIIP OPERATIONS	17
4.1 RTC TRAINING CYCLE	17
4.2 AREAS AND FUNCTIONS REVIEWED.....	17
4.2.1 <i>Clothing Inventory Organization and Flows</i>	17
4.2.2 <i>Replenishment, Receiving and Warehousing Operations</i>	18
4.3 PHASE LINE ISSUE PROCESSES	18
4.3.1 <i>Phase Lines</i>	18
4.3.2 <i>Issue Stations</i>	19
4.3.3 <i>Fitters</i>	19
4.3.4 <i>Recruit Labor</i>	19
4.4 PHASE I ISSUE PROCESS.....	19
4.4.1 <i>Planning/Preparation for Recruit Processing</i>	19
4.4.2 <i>Initial Recruit CIIP Processing</i>	20
4.5 PHASE II RECRUIT CIIP ISSUE PROCESSING.....	21
4.6 OTHER ISSUE AND EXCHANGE ACTIVITIES	21
4.6.1 <i>Clothing Turn-in Process</i>	21
4.6.2 <i>Clothing Exchange & Replacement Process</i>	21
4.6.3 <i>Special Measurement Process</i>	22



4.6.4	<i>Quality Deficiency Reports</i>	22
5.0	IMPLEMENTATION OF QLM/LOCAL	23
5.1	IMPLEMENTATION SCHEDULE FOR QLM/LOCAL.....	23
5.1.1	<i>QLM/Local System Implementation Activities</i>	24
5.1.2	<i>Concurrent Supporting Logistics Activities</i>	25
5.2	DATA ARCHITECTURE AND DATA FLOWS.....	26
5.3	PROGRAM CONVERSION & MODIFICATION ACTIVITIES.....	26
5.4	HIGHLIGHTS OF IMPLEMENTATION & SUPPORT ACTIVITIES.....	26
5.4.1	<i>Fort Leonard Wood Project Activities</i>	27
5.4.2	<i>Fort Sill Project Activities</i>	27
5.4.3	<i>Fort Benning Project Activities</i>	28
5.4.4	<i>Fort Knox Project Activities</i>	28
5.4.5	<i>Fort Jackson Project Activities</i>	29
5.4.7	<i>Summary Statistics August 2002</i>	29
5.4.8	<i>QLM/Local System Development and Implementation Activities</i>	30
5.4.9	<i>Help Desk Activity</i>	31
5.5	QLM/LOCAL IMPLEMENTATION ISSUES AT THE CIIPS	33
5.6	CONVERSION & QLM/LOCAL GO-LIVE.....	35
5.6.1	<i>Initial QLM/Local Inventory Values</i>	39
5.6.2	<i>QLM/Local Receipt Processing</i>	39
5.7	CONTINUING OPERATIONS OF ACIIPS/R AND QLM/LOCAL	40
5.8	LESSONS LEARNED DURING QLM/LOCAL IMPLEMENTATION	41
5.8.1	<i>Initial Code Set-up</i>	41
5.8.2	<i>Inventory Draw-down Levels</i>	41
5.8.3	<i>Shipping Plan/Predictive Forecasting Inventory Replenishment</i>	41
5.8.4	<i>Physical Inventory Processes</i>	41
6.0	AUTOMATED RECEIVING DEVELOPMENT & PROLIFERATION	43
6.1	AUTOMATED RECEIVING PROJECT OVERVIEW.....	43
7.0	TECHNICAL APPROACH FOR QLM/LOCAL ROLLOUT TO CIIPS	45
7.1	INITIAL SITE VISIT & REQUIREMENTS ASSESSMENT	45
7.2	SET UP QLM/LOCAL FOR EACH RTC CIIP	46
7.3	SET UP QLM/LITE FOR EACH RTC CIIP	47
7.4	INSTALLATION, INITIAL TRAINING & "GO-LIVE" SUPPORT	47
7.5	DOCUMENTATION.....	48
7.6	POST IMPLEMENTATION TRAINING & SUPPORT	49
7.7	OPERATIONAL MANAGEMENT & MAINTENANCE	49
8.0	TECHNICAL APPROACH FOR ON-GOING SUPPORT TO CIIPS	51
9.0	TECHNICAL APPROACH FOR AUTOMATED RECEIVING	52
10.0	RESULTS ACHIEVED & METRICS	55
10.1	OPERATIONAL OBJECTIVES & RESULTS.....	55
10.2	INVENTORY MANAGEMENT METRICS	56

11.0	SUMMARY OF BENEFITS ACHIEVED.....	59
	APPENDICES.....	62
	APPENDIX A – DEFINITION OF ACRONYMS.....	63
	APPENDIX B – SITE SURVEY PROCESS & CHECKLIST	67
	APPENDIX C – PROJECT PERSONNEL.....	71
	APPENDIX D - ARN SUPPLY CHAIN MANAGEMENT FINAL TECHNICAL REPORTS.....	75
	APPENDIX E – RF TECHNICAL REPORT, FT. JACKSON, SOUTH CAROLINA	76

Supplemental Figures and Tables

		<u>Page</u>
Figure 1 – Systems Architecture.....		4
Figure 2 – QLM/Local Implementation Matrix and Timeline		5
Figure 3 – ARN/VPV System Interfaces & Data Flows.....		15
Figure 4 – QLM/Local Installation Timeline		23
Table 1 – Ft. Leonard Wood Receipt Processing Analysis		40
Table 2 – Ft. Leonard Wood Monthly Expense Projections.....		56
Table 3 – Ft. Leonard Wood Inventory Issue Analysis by Month		57
Figure 5 – Ft. Leonard Wood CIIP Usage.....		57
Table 4 – Ft. Leonard Wood Recruit Load Factor & Recruit Variance.....		58



PREFACE

This Final Technical Report covers work accomplished for the Apparel Research Network (ARN) of the Defense Logistics Agency (DLA) in conformance with Delivery Order 0010 during the period 23 February 2000 to 31 January 2002.

It specifically covers the analysis, design, development, rollout, and ongoing support of the Quality Logistics Management (QLM) Local system at four U.S. Clothing Initial Issue Points (CIIPs), Ft. Sill, Ft. Benning, Ft. Knox, Ft. Jackson, following successful prototyping at the Ft. Leonard Wood CIIP.

Implementation of QLM/Local is part of the ARN Supply Chain Management system for reduced military clothing inventories through automated systems for asset visibility at the wholesale, retail and manufacturing levels and balanced flow replenishment. Prior to this implementation the ARN Partners had developed a centralized DataMart (ARN Asset Visibility System), developed a balanced flow replenishment system (BIFRS), implemented a retail inventory management system (QLM/Retail) at the Marine Corps Recruit Depot in San Diego (MCRD-SD), and implemented QLM/Local at the Ft. Leonard Wood CIIP. These developments are documented in ARN Final Technical Reports (see Appendix D – ARN Supply Chain Management Final Technical Reports).

Ongoing ARN Supply Chain Management System projects include:

- Development of ASAP (ARN Supply-chain Automated Processing) for tracking manufacturing assets and electronic invoicing;
- Development of ASTRA (ARN Supply-chain Transaction Repository Audit) for validation of MILSTRAP and other transactions before they are transferred to SAMMS and DataMart.
- Development of VIM/QLM-Central;
- Implementation of the complete ARN Supply Chain Management System at the Marine Corps Recruit Depots;
- Implementation of BIFRS-Wholesale; and,
- Linkage of 3D body scan data to clothing form scan data at the MCRD-SD to obtain critical issue data for replenishment of stocks.

ARN Program information is available from the ARN web site at <http://arn.iitri.org>.



1.0 EXECUTIVE SUMMARY

1.1 Overview

This paper presents a summary of the results of the installation and support of the QLM/Local wholesale local inventory management system at Ft. Sill, Ft. Benning, Ft. Knox, Ft. Jackson, and provides information on the results of the implementation. The following sections of this document describe the entire implementation process from the initial survey and recommendations to this final technical report.

The success of the implementation is evident throughout the report. The system recommendations were developed based on the guidance from the Department of Defense Logistics Agency that the efforts and system should focus on assisting the Army's effort to reduce inventory investment by implementing technologies and practices developed by the Apparel Research Network (ARN). Detailed guidance was provided throughout the project by ARN program management.

1.2 Project Approach

The AdvanTech, Inc. project team conducted a three-day site survey at each of the four CIIPs, which included an orientation briefing, a discussion of the project objectives and an explanation of the implementation schedule. The basis for the implementation was the QLM/Local system that was prototyped at Ft. Leonard Wood.

During Week 1 of the schedule the QLM/Local hardware, software, and communications was installed and tested. Week 2 of the schedule included pre-conversion activities, initial training, and identification of local processes and procedures that require tailoring of QLM/Local. Week 3 was dedicated to post-conversion activities, initial operation of the system, continued training, and support activities.

Representatives of the Defense Support Center Philadelphia (DSCP) and TRADOC accompanied the project team during the initial assessments and implementation. The implementation of QLM/Local was followed by an extended period of direct support and training to the local CIIP management and operating personnel, to ensure comprehensive knowledge of the system and attainment of the inventory reduction and a balanced flow of apparel items.

Additionally, a short-term project (STP) was initiated at Ft. Jackson to conduct a Complete Business Process Review and Systems Interface Assessment, and secondly to automate the QLM/Local receipt process in order to gain near real time data updates. The business process review and systems interface assessment was to evaluate and report on the business practices and system interface issues in place that may be adversely affecting the inventory balances and the operation of the CIIP, and recommend solutions to these problems. The receiving process was automated to provide the speed and accuracy that the CIIPs require during heightened activity of the summer surge and winter exodus. This significantly reduced the inventory



discrepancies that have been rampant in 3 of the 5 Army CIIPs. It was believed that by automating the receiving process, time consuming and error prone batch processes currently in place at each CIIP could be eliminated and also eliminate potential timing problems associated with the use of 2 different systems used to record receipts and issues.

1.3 QLM/Local Rollout Installation Process Overview & Protocol

Site Survey Visit – Orientation Briefing and Discussion

- Reviewed system pre-installation set-up process at AdvanTech.
- Reviewed weekly on-site set-up and training process.
- Identified the QLM/Local system administrator.
- Continued the explanation of QLM/C and AAVS Data Mart FTP milieu.
- Explained the FTP process and timing issues in coordination with other sites.
- Explained initial capitalization inventory process.
- Explained system security features, including separate menus for separate user types.
- Mentioned process for clothing returns, adjustments to inventory.
- Discussed pre-conversion training process.
- Itemized need for multi-receptacle UPS, dedicated phone line, Internet connection, and anti-Virus software to be provided by the host site.
- Demonstrated inventory screens on laptop computer.

Week 1 – Install QLM Hardware and Software

- Conduct system function and capabilities overview meeting with all interested staff
- Unpack and set up equipment
- Test system: modem, Internet connection, PCAnywhere access, laser scanner, UPS, and printer.
- Set up file transfer times through dial up network FTE protocols.
- Set up password list.
- Review QLM menu options with system users, system administrators.
- Review screens requiring file building over the coming week, with the staff who will be doing daily data entry: weekly expects table, standard issue table, and stockroom item list.
- Set up screen saver: QLM Local marquis.
- Plan education schedule for pre-live week.
- Conduct regular question and answer sessions.

Week 2 – Pre-Conversion & Go-Live

- Check that tables were correctly completed over the previous week.
- Present all staff with user manuals.
- Begin user training via a review of menu options and their functions.



- Begin system administrator training via a review of unique menu options.
- Spend hands-on time with users in the receipts, adjustments, and corrections to receipts functions.
- Review useful reports: on hand inventory balance, open requisitions, receipts history, etc.
- Follow up on all outstanding system questions.
- Ensure preparedness for go-live.

Week 3 – Post-conversion

- Oversee data entry of receipts and inventory adjustments.
- Continue training on all menu selections not addressed the previous week.
- Review and print reports as desired.
- Create purchase orders for any items that have been received without system-created purchase orders.
- Receive goods/close orders for items covered on manually created purchase orders.
- Initiate daily verification of FTP success.
- Follow up on all outstanding system questions.
- Confirm dates for Phase III training. Celebrate a successful implementation.

After careful assessment the ARN Team, DSCP and TRADOC agreed on an approach that would implement the full ARN Supply Chain System, including QLM/Local, VIM/QLM Central and BIFRS, with DSCP taking ownership of the new clothing inventory assets. For details of assessment and implementation see documents at Appendix D.

1.4 Process And Systems Interface Assessment, Automate Receipt Process

- Perform a business process and system interface review of the Ft. Jackson CIIP, determine the issues that are adversely affecting the DSCP asset management and smooth operations at the CIIP, recommend solutions and report the findings.
- Create a feasibility study that discusses the opportunity of applying recommended process improvements and systems changes to other CIIPs and MCRDs.
- Research the available technologies and determine the most efficient solution(s).
- After gaining approval from the Program Manager to proceed with a recommended technology solution, develop the prototype software solution to automate the receiving process.
- Deploy the prototype solution to Ft. Jackson S.C.
- Test the prototype software solution at Ft. Jackson S.C.

1.5 System Architecture

The ARN Asset Visibility System (AAVS) and AAVS DataMart have been created to collect data into a single source to provide Item Managers at the retail (Recruit Training Centers) and wholesale (DSCP) level with clear visibility of all recruit clothing assets (National Stock Numbers [NSNs] within Product Grouping Codes [PGCs]) in all segments of the supply chain. Operational data is extracted from the SAMMS Clothing & Textile (C&T) server and used as the basis for the operational and decision support capabilities in the Virtual Item Manager (VIM) system incorporating QLM/Central for wholesale inventory management capabilities.

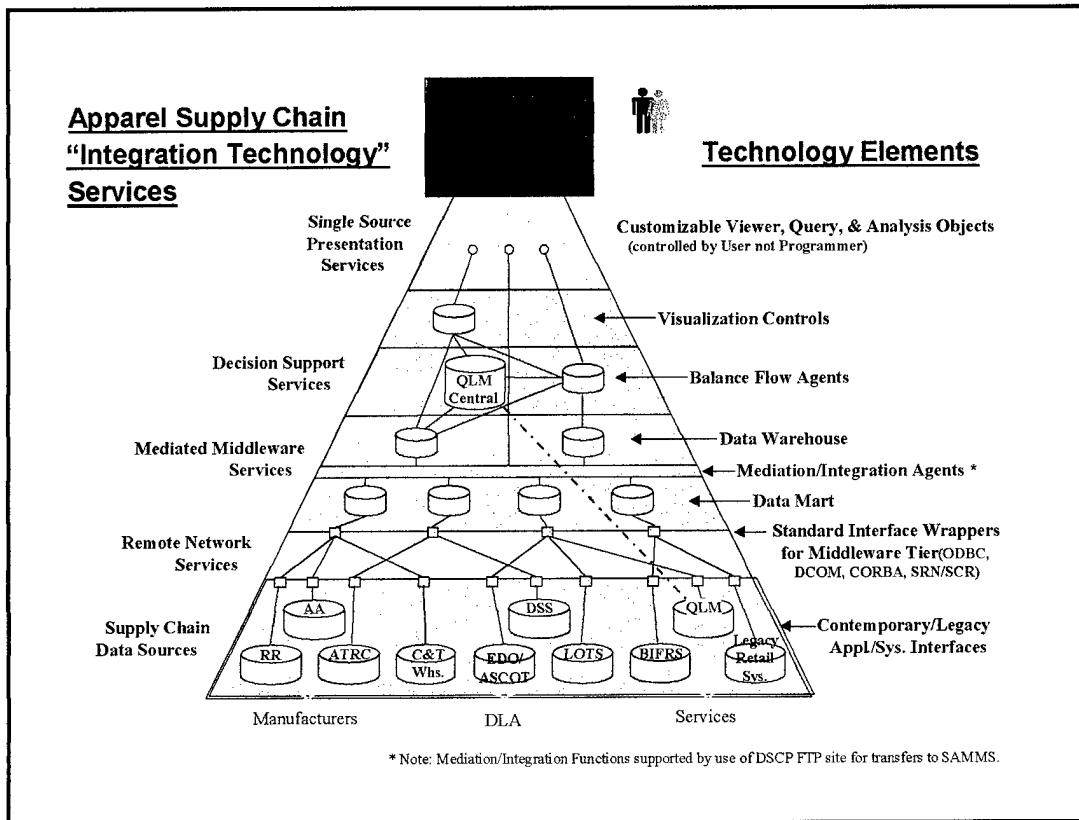


Figure 1 – Systems Architecture.

As shown in Figure 1, the concepts employed in the relationships between ACIIPS, QLM/Local and VIM-QLM-Central provide for inventory management and stock replenishment by linking support and systems from the lowest to the highest levels. At the bottom of the pyramid, the transaction processing capabilities of both ACIIPS and QLM/Local provide for recording of the issue and receipt transactions. This information is "rolled-up" into the AAVS DataMart and displayed to Item Managers via the VIM/QLM-Central capabilities. This allows the managers at the different levels to have visibility of the inventories at both wholesale depot and wholesale local and to manage replenishment as supplies are used to support CIIP operations.

1.6 Implementation

The implementation at Ft. Sill, Ft. Benning, Ft. Knox, Ft. Jackson took place from 23 February 2000 to 1 October 2000 with post-implementation support through 31 January 2002. The implementation process occurred in several phases. The key steps were site preparation activities, implementation planning and training, go-live, QLM/Local operations and post-implementation support. The project was completed in a very short period of time with overlapping support and implementation efforts at the sites as shown in the following figure.

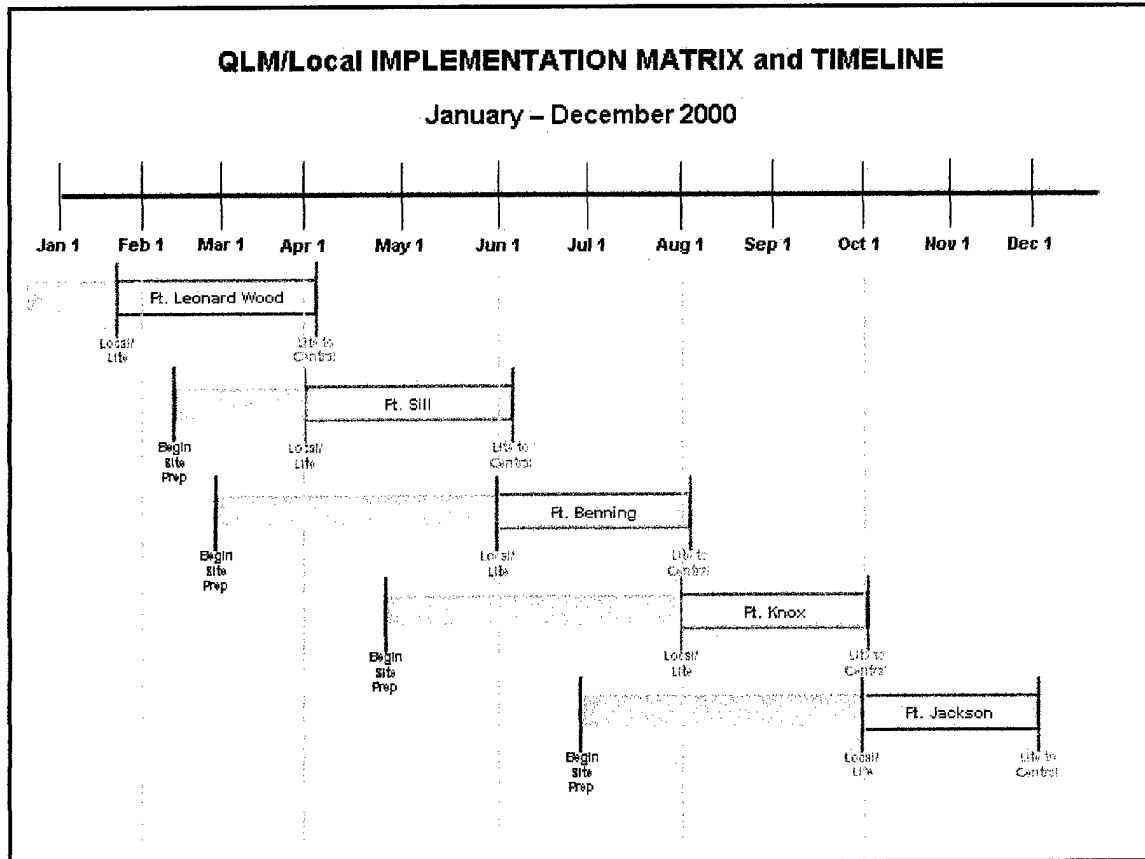


Figure 2 – QLM/Local Implementation Matrix and Timeline

Following the initial site survey, the recommendations for the site were prepared and approved, and the hardware/software prepared (hot-staged), shipped and installed. Testing of the system software then followed these initial steps. Concurrent with the installation and testing activities, personnel at the four RTCs were provided with initial training related to how the QLM/Local system was designed to provide support along with changes in the use of the ACIIPS to process daily issues.

At the same time the QLM/Local system implementation activities were occurring, there were other logistics activities being accomplished including collection of the ongoing issues data recorded in the four ACIIP Systems for the three months preceding the planned go-live date.

This information was carefully analyzed as part of the process of data table build and data conversion in preparation for system activation.

QLM/Local at Ft. Sill. The Site Survey was completed 10 February 2000. The implementation was completed during the period 20 -31 March 2000.

Fort Sill Retail Consumption Statistics:

Dollar Value on Hand	\$3,691,213
Average Daily Usage	\$70,148
Days on Hand:	50

QLM/Local at Ft. Benning. The Site Survey was completed 14 March 2000. Implementation activities on-site began 8 May 2000. Phase I Training was completed 8-12 May. Pre Go-Live/Go-Live was completed 22-26 May. Phase II Training was completed 29 May- 2 June. Fort Benning Initial Consumption Statistics:

Dollar Value on Hand	\$3,461,437
Average Daily Usage	\$61,058
Days on Hand:	57

QLM/Local at Fort Knox. The site survey was conducted on 18 April 2000. QLM/Local went live 22 June with initial inventory valuation a \$2,771,111.80. Ft. Knox Initial Consumption Statistics:

Dollar Value on Hand	\$2,638,374
Average Daily Usage	\$38,123
Days on Hand:	69

QLM/Local at Fort Jackson. Initial Site Visit occurred on 17-19 May. Phase I Training scheduled for the last week of July. Cap/Decap and go-live occurred on 21 August. Ft. Jackson Initial Consumption Statistics:

Dollar Value on Hand	\$ 6,813,391
Average Daily Usage	\$133,740
Days on Hand	51

Today, operations at the four CIIPs are managed with an integrated approach using ACIIPS, QLM/Local and VIM/QLM-Central Operations. ACIIPS today continues to provide transaction registers of the daily issues to recruits and also several standard reports documenting financial transactions.



1.7 Summary

As with any new system, there were numerous difficulties and issues encountered that had to be resolved as efforts progressed. The following items highlight the key lessons learned that needed to be considered for future ACIIPS – QLM/Local conversion and rollout efforts:

- Implementation Planning & Initial Code Set-up;
- Inventory Draw-down levels;
- Shipping Plan/Predictive Forecasting Inventory Replenishment; and,
- Physical Inventory Processes.

The successful resolution of these issues at the four CIIPs will significantly improve future implementations of the QLM/Local.

In conclusion, the VIM/QLM-Central and QLM/Local systems provide the Retail and DSCP Item Managers with the essential abilities to affect both the Retail and the Wholesale inventory draw down objectives, and to monitor and report on progress achieved. The initial reduction in inventory at the four CIIPs prior to the capitalization/de-capitalization amounted to \$27,259,068.13.

This project has provided several benefits and a substantial return-on-investment for DLA and DSCP. It continues to enhance management of the CIIP's wholesale local ("retail local") inventory. Benefits have been provided through the development and implementation of comprehensive decision support tools based on the proven concepts and approaches of the QLM system previously installed at Marine Corps Recruit Depot-San Diego and Ft. Leonard Wood to support operations at those CIIPs.



2.0 INTRODUCTION

The Quality Logistics Management (QLM™) Client/Server System (QLM-C/S) has been fully installed and is operational at the four CIIPs. The system using QLM/Local supports the functional requirements of the local wholesale supply chain management for recruit clothing. The Army ACIIPS system provides information on issues to QLM/Central. This system is linked for inventory requisitioning purposes to the Defense Supply Center Philadelphia's (DSCP) Automated System for Cataloging and Ordering of Textiles (ASCOT) and the Standard Automated Material Management System (SAMMS) through FTP sites and dial-in programs.

2.1 Overview of System Architecture

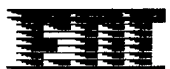
The ARN Asset Visibility System (AAVS) and AAVS DataMart have been created to collect data into a single source to provide Item Managers at the retail (Recruit Training Centers) and wholesale (DSCP) level with clear visibility of all recruit clothing assets (National Stock Numbers [NSNs] within Product Grouping Codes [PGCs]) in all segments of the supply chain. Operational data is extracted from the SAMMS Clothing & Textile (C&T) server and used as the basis for the operational and decision support capabilities in the Virtual Item Manager (VIM) system incorporating QLM/Central for wholesale inventory management capabilities.

VIM/QLM-Central has been developed as an independent network server linking C&T SAMMS, AAVS DataMart and QLM/Locals into a single unit/integrated systems approach for recommending relocation of uniform items from "depots" to CIIPs. To accomplish this, the base QLM-Client/Server was modified to use data from the AAVS DataMart for decision support and management of inventory in the supply chain. A web-based interface with the Virtual Item Manager (VIM) was incorporated in VIM/QLM-Central.

VIM was developed to provide a common user interface for Item Managers to use to manage the supply chain using inventory data flowing from the retail and wholesale levels to the AAVS DataMart and VIM/QLM-Central. The Virtual Item Manager (VIM) as it is being developed uses a combination of computer and web-based software that provides Item Managers with the supply chain and inventory information necessary to expedite distribution of assets. The relationships of the systems comprising the supporting information systems architecture are shown in the figure in the preceding section (see Figure 1 – Systems Architecture).

The implementation of QLM/Local as it was implemented at four CIIPs involved processing the MILSTRIP transactions of the Army Clothing Initial Issue Point System (ACIIPS) through VIM/QLM-Central. After processing, the issue information in MILSTRIP format is transferred to ASCOT and then processed through SAMMS.

This process involves converting the ACIIPS issue data into a format for the Army's conversion to T23 format for processing through the Department of the Army's Standard Financial System (STANFINS).



2.2 Scope of the Project

The scope of this project required Project Team members to coordinate several different tasks and activities. The initial activity included the conduct of analysis and definition of the server and MILSTRIP interfaces between ACIIPS and QLM/Local with TRADOC and the four CIIPs. Tailoring of system software, testing, and implementation of the QLM/Central and QLM/Local systems to mirror ACIIPS' MILSTRIP transactions at the four CIIPs followed this.

The systems required programming to transfer mirrored MILSTRIP data from the ACIIPS at the four CIIPs to VIM/QLM-Central and back to QLM/Local for DSCP and Local Item Managers to collaborate on the management of DSCP-owned stocks through the VIM/QLM-Central common user interface. To accomplish this, MILSTRIP data from ACIIPS and QLM/Local-FLW is transmitted via the ARN AAVS DataMart to the project contractor AdvanTech, Inc., for asset visibility, decision support, and inventory management.

The QLM/Local Server hardware and systems software (i.e., the Windows NT Operating System) were provided by DSCP. The contracts to establish communication linkages for QLM/Local were handled by AdvanTech, and the Project Team subsequently oversaw the installation and training in the use of the Internet Service Provider (ISP) software and communication capabilities to transfer information to QLM/Central via file transfer protocols (ftp). After initial development and testing, QLM Local was moved to operational status at the four CIIPs.

The Project Team followed development of the initial system design requirements with implementation and "go-live" support. This activity provided essential support for the construction of all data tables and data conversion necessary to obtain issue information from ACIIPS. Initially, the data transferred from the ACIIPS was maintained in a "stockroom" of the QLM/Central "Lite" application system at AdvanTech. This was specifically set up to permit AdvanTech and designated Item Managers to manage the DSCP-owned stock at the CIIPs until the function was transferred to VIM/QLM-Central.

Subsequent to implementation and go-live, the Project Team provided support for system operation and management support. During the construction of VIM/QLM-Central, there was a period of time when the system was operational based on the use of the VIM/QLM-Central "Lite" capabilities. During this time, AdvanTech provided system operational and management support to the DSCP and Wholesale Local Item Managers, providing recommendations for QLM/Local operations and routine inventory support. These activities required close collaboration with personnel at DSCP as well as on-going and frequent communication with personnel at the CIIPs.

Throughout the project, AdvanTech provided routine reports and project status updates. Status reports were routinely provided on a monthly basis by email and hard copy. Monthly Interim Progress Reports (IPRs) were prepared and provided. This document is the Final Technical Report.



2.3 Short Term Project Objectives

The objectives of the Short Term Project (STP) and project proposal leading to this FTR included:

- Implement QLM/Local to mirror ACIIPS' MILSTRIP transactions at the four CIIPs. Upon implementation of QLM/Local, the system was to be used immediately to start making decision support recommendations based on ACIIPS issue input.
- Essential order and inventory management information was to be transmitted from ACCIPS and QLM/Local to VIM/QLM-Central via ASCOT, SAMMS and the AAVS DataMart, with VIM providing the common data and user interface.
- The overall objective was to provide the DSCP Item Managers, through the VIM/QLM-Central system functions, the information they needed to manage and control DSCP-owned inventory at the CIIPs.

The following sections present the specific objectives of different stakeholders based on formal guidance and discussions. These objectives guided the ARN Team's investigation, development of evaluation criteria, and analysis of alternate courses of action.

2.3.1 Ft. Knox, Ft. Benning, Ft. Sill & Ft. Jackson Objectives

The mission of the CIIPs is to deliver the highest quality, best fitting clothing to their soldiers ("war fighters"). They must have complete issue stocked and ready to support the training center's mission and to avoid (at all costs) going out-of-stock on any item.

The following objectives were gathered during initial discussions with CIIP personnel. These were reviewed at the summary out-briefing presentation provided at the conclusion of the initial site visit.

- Transfer Inventory Accountability
 - o Issue All Clothing on First Recruit Pass
 - o Obtain Predictable, Consistent Replenishment Support
- Maintain High Level of Operational Quality:
 - o More items at wholesale support activity
 - o More Bill & Hold
 - o Less Quick Response
 - o Timely Transaction Postings
 - o Data Reliability
- Achieve Improvements
 - o Obtain Efficient Visibility of Requisition Transactions



- o Reduce Time Required for Daily Reconciliation
- o Consolidate Operations & Reduce Space
- Implement State-of-the-art Systems and Procedures
 - o Equipment
 - o Technology
 - o Management Practices

2.3.2 TRADOC Objectives

The following objectives were based on previous discussions with TRADOC personnel and from comments gathered during the Project review activities at the CIIPs.

- Implement ACIIPS-R (concurrent with development of QLM/Local)
- Obtain Predictable, Consistent Support
- Reduce Space and Consolidate Base Operations
- Increase Operational Efficiency
- Explore Alternative Inventory Management Processes
- Optimize Support to War Fighters
- Lower Inventory Costs
- Interface with Army Legacy Systems
- Changes recommended should not affect military staffing, i.e., no reductions-in-force

2.3.3 DSCP Objectives

The following objectives were the ARN Team's understanding of the objectives of DSCP based on previous input and discussions during the on-site review activities.

- Assist Army in Reducing Inventory Investment Through DLA Inventory Ownership, Automation, & Modern Replenishment Practices
- Design New Processes for Efficient Roll-Out to Other Sites
- Prove New Designs at Ft. Jackson

2.3.4 DLA Objectives

The following objectives are based on the statement of work for the project support and incorporate insights from previous discussions and input received from DLA project management.

- Implement and Demonstrate ARN Concepts to Reduce Total Supply Chain Inventories including:
 - o Total Asset Visibility
 - o Full Automation
 - o Balanced Flow
 - o Automated Receiving
- Prove Concept & Processes for Effective Transfer to Other RTCs

All of these objectives as stated in 2.3.1 to 2.3.4 have been met and ACIIPS/R, QLM/Local and VIM-QLM/Local Central are functioning today as an integrated system. The over arching project objectives of Total Asset Visibility and automation of supply/inventory replenishment at the CIIPs using QLM/Local and VIM/QLM-Central have been met. The effectiveness of the system functionality has been proven and the rollout to other RTCs has been effected.

2.4 Definition of Terms

“Wholesale Local” inventory. The inventory of an RTC combined with the RTC bulk or DCSP bulk inventory that is co-located, or in close proximity, and *owned by DSCP*.

DOS: Required quantity for a day (higher level of granularity, e.g., at the PGC level) – Required quantity of the right item of the right size for a day, e.g., PGC+Tariff at the NSN Level and DOS is expressed in units (quantity).

Two definitions for Days of Supply:

- Retail DOS or RDOS
- Annual Wholesale DOS or ADOS

Computation of RDOS is based on data provided to the AAVS Data Mart for the RTC:

- Number of Recruits on a weekly basis (based on Accession Plan)
- Tariff for the RTC
- Using these two items, BIFRS-W algorithms are used to compute the annualized DOS. By performing the computation in a “central” location as opposed to the



individual RTCs, any changes to the computation algorithm can be easily implemented.

Computation of ADOS is based on two components:

- Predicted data for RTCs
- Historical data based on past sales for other (non-RTC) sales in the respective military service including all military sales for items used by the RTCs, so that usage on “common items” is captured.
- Both data items will come from AAVS and be used by BIFRS-W algorithms for computing WDOS with BIFRS-W algorithms used in calculating the ADOS for individual RTCs.



3.0 SYSTEM ARCHITECTURE & OPERATIONS

3.1 Overview of System Architecture

The overall focus of the ARN Asset Visibility System (AAVS) and AAVS DataMart is on the collection of data in a shared repository for use by the Item Managers at the retail (RTCs) and wholesale (DSCP) levels. The systems incorporated in this integrated approach are designed to provide all users with clear visibility of all recruit-clothing assets throughout all segments of the supply chain. Further, the systems extract operational data from the Clothing & Textile (C&T) server and use this information as the basis for supporting decisions by the Item Managers for supporting operational needs. Thus, the Virtual Item Manager (VIM) system incorporates the decision support capabilities of QLM/Central for wholesale inventory management requirements.

In the efforts that have been accomplished to-date, VIM/QLM-Central provides an independent network of servers linking C&T SAMMS, AAVS DataMart and QLM/Locals into an integrated system for recommending relocation of uniform items from "depots" to the supported RTCs. To create this integrated systems approach, the base QLM-Client/Server was modified to use data from the AAVS DataMart for decision support and management of inventory in the supply chain.

A web-based interface with the Virtual Item Manager was incorporated in VIM/QLM-Central. VIM was developed to provide a common user interface for Item Managers to use to manage the supply chain using inventory data flowing from the retail and wholesale levels to the AAVS DataMart and VIM/QLM-Central. The Virtual Item Manager (VIM) as it is being developed uses a combination of computer and web-based software that provides Item Managers with the supply chain and inventory information necessary to expedite distribution of assets.

The implementation of QLM/Local as it was implemented at the CIIPs involved processing the MILSTRIP transactions of the Army Clothing Initial Issue Point System (ACIIPS) through VIM/QLM-Central. After processing, the issue information in MILSTRIP format is transferred to ASCOT and then processed through SAMMS.

This process involves converting the ACIIPS issue data into a format for the Army's conversion to T23 format for processing through the Department of the Army's Standard Financial System (STANFINS). This STP constituted the major rollout of QLM/Local to the remaining U.S. Army Recruit Training Center (RTC) to support CIIP operations following the VIM/QLM-Central proof of concept with the QLM-Client/Sever system previously implemented at US Marines Corps' San Diego Recruit Training Center and at the Ft. Leonard Wood CIIP.

3.2 General Concept of Operations

In preparation for transfer of ownership of recruit clothing assets at the CIIPs to DSCP, AdvanTech implemented the Quality Logistics Management (QLM) system. The purpose of the QLM/Local system is to provide restock recommendations based on RTC projections of the



numbers of recruits to be trained/processed through the CIIP, and the actual clothing issues information provided by the Army Clothing Initial Issue Point System (ACIIPS). System relationships and data flows are illustrated in Figure 2.

Concurrent with the transfer of inventory assets to DSCP ownership, the CIIPs' stock locations were designated as a new DSCP RIC (Routing Identifier Code) or Depot. The CIIPs' transactions are sent via file transfer protocol (ftp) to QLM/Central at AdvanTech. QLM/Central then processes the ACIIPS issue information, adjusting the quantities of individual NSNs available for issue, generating replenishment requirements, and manages the local inventories. Issues, Receipts, Adjustments, and Redistribution Requests are transmitted into SAMMS via the Clothing & Textiles (C&T) Ascot Server daily from QLM/Central.

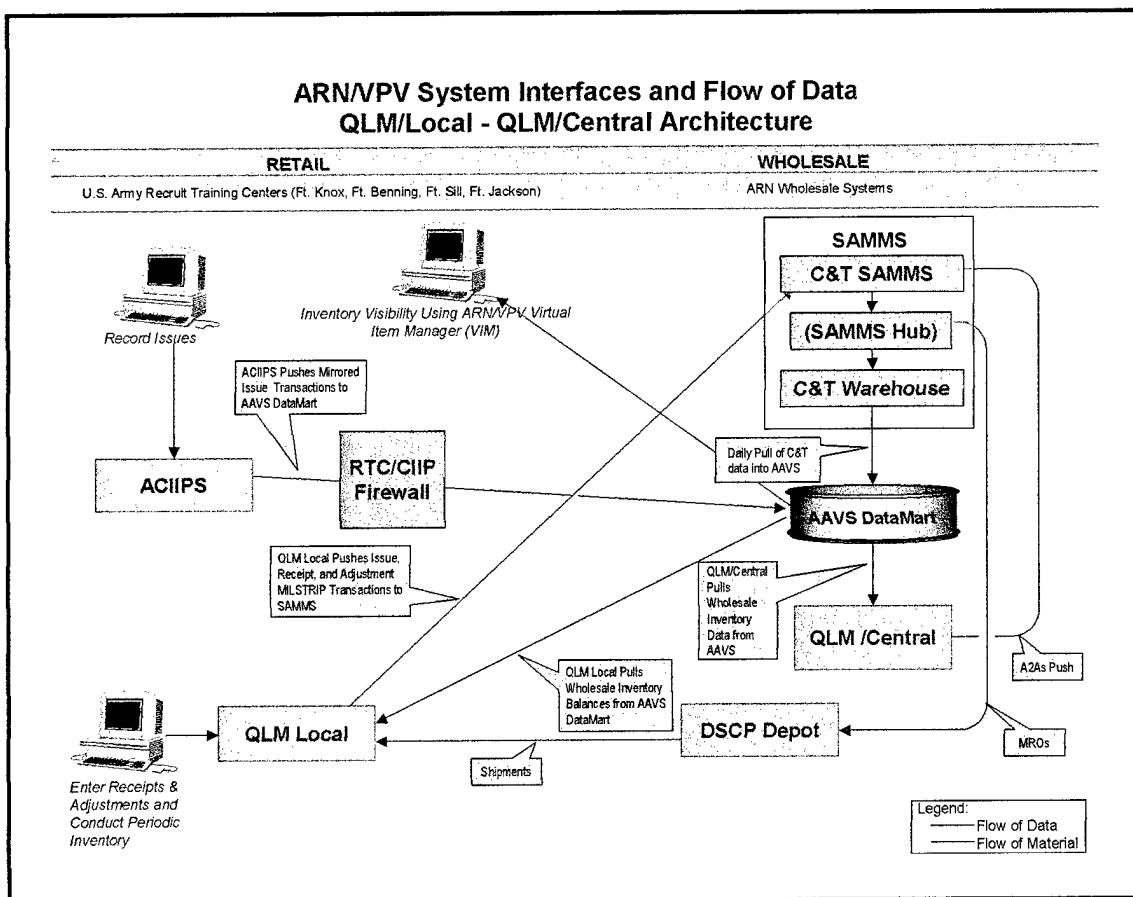


Figure 3 – ARN/VPV System Interfaces & Data Flows

This approach, as illustrated above in Figure 2, shows that there is no interference with the Clothing Initial Issue Points (CIIPs) and ACIIPS operation, and minimal impact on current system operation and resources. The objective was to make the transfer of asset ownership with inventory replenishment responsibilities to DSCP and implementation of QLM/Local and QLM/Central as transparent as possible to the CIIPs and to ACIIPS. As designed, QLM/Central pulls wholesale inventory stock levels from AAVS DataMart to determine ship-points (depots or bill & hold locations) for the redistribution requests.

QLM/Local operates outside the CIIPs' firewalls, and does not require access to the CIIPs' Local Area Network (LAN) or the campus area network (CAN). The CIIPs' procedures have remained the same, with the addition of periodic inventory using handheld terminals and the entry of receipts and adjustments directly into QLM/Local. A DSCP-sponsored telephone line is being used for QLM/Central to gather all inventory data and transactions from QLM/Local. As a result of implementing this operational scenario, there was no need for access to the LAN and CAN.

CIIP personnel have full visibility of DSCP's wholesale-local inventory. This is provided through the Virtual Item Manager (VIM) Internet browsing capability into the Apparel Asset Visibility System (AAVS) DataMart, an Apparel Research Network (ARN) initiative now in prototype. Finally, AdvanTech uses a dial-up telephone line to QLM/Local for the purpose of system software maintenance.

4.0 CIIP OPERATIONS

This section provides a brief overview of the CIIP operations. It includes a summary description of each of the processing activities and issue stations that a new recruit passes through during the initial training programs. (See the ARN Web Site for all related project reports.)

4.1 RTC Training Cycle

The entire basic training cycle is a short 8-week period. Because training activities are tightly scheduled, there is no time for a soldier to wait until they can get a critical part of his/her initial issue. The training schedule for the new soldiers is very strict time from the point of departure (MEPPS Station) to Basic Training Center (BTC) to their Advanced Individual Training (AIT).

According to CIIP representatives at Ft. Jackson and Ft. Sill, a large percentage of the females going through the training cycle do not pass weapons qualification before the 5th week of the cycle when Phase II issue is distributed. This issue can cause major difficulties between the Automated Clothing Initial Issue Point (ACIIP) system and the military units and is an area that has to be considered in developing and implementing automated solutions for inventory management and replenishment using predictive forecasting.

4.2 Areas and Functions Reviewed

The ARN Team reviewed all of the elements of the Clothing Initial Issue Point operations in support of Recruit Training Center activities during the initial site visit as noted. This review was critical to insure thorough understanding of current operations including how the Army's single stock fund would be implemented. In addition, the review provided a sound basis for evaluating alternatives that ultimately led to the selection of the use of QLM/Local and QLM/Central to support the transfer of asset ownership to DSCP and to manage the uniform assets as a wholesale local inventory.

4.2.1 Clothing Inventory Organization and Flows

In general, at each of the CIIPs, the clothing issue for the new recruits going through training is warehoused and segregated by training phase and by male and female (at RTCs having female training): 1) Phase I Male and Female; 2) Male Phase II Issue; and 3) Female Phase II Issue. Alterations are done in the Phase I warehouse for male/female Phase I Issues area, and in separate buildings or areas of the same building for Phase II Male, and for Phase II Female issues.

4.2.2 Replenishment, Receiving and Warehousing Operations

At the time of the initial site visit by the ARN Project Team, inventory stockage levels had been revised to reduce inventory as part of preliminary planning for the implementation of the Army's single stock fund. Also, DSCP had been managing routine replenishment and improved service levels by using a dedicated truck for some RTCs. This enhanced distribution support was providing an estimated 10-day reduction in order-ship time (OST). All stock that is received is processed centrally and then moved to the appropriate storage location.

Prior to implementing QLM/Local, the CIIPs were generally replenishing inventory every day with material requisitions processed through CTAS to SARSS to DASC. This process did not change substantially following implementation of the new systems and transfer of asset ownership to DSCP.

During the initial site visit, review of current operations resulted in the observation that it would be very difficult to separate the bulk "warehouse" inventory from the stock in the issue line. As a result, DSCP determined that the transfer of assets would include all inventory rather than trying to devise a method for operations with the "phase line" inventory handled separately and owned by the Recruit Training Center.

4.3 Phase Line Issue Processes

As part of the planning for the implementation of QLM/Local at the CIIPs, it was necessary to understand the current operations and related procedures for operational support. This section provides an overview of the recruit processing and related issue activities.

4.3.1 Phase Lines

Generally the CIIPs have two clothing issue lines, except at the RTCs where there is female training. Phase I is usually located in the recruit reception processing building and consists of all PT clothing, underwear, and field clothing. Both males and females use the same issue line, but at different times. Phase II is generally located in the same building or close to the Phase I dress clothing issue.

Where there is female training there are two Phase II lines, one for males and one for females. Males and females are processed at different times so the same Phase II fitters can operate both lines.

Each of the Phase lines has multiple issue stations. These stations allow for the recruits to be processed through issuance of individual uniform items in a sequential manner.

4.3.2 Issue Stations

Each issue line is broken down into stations with one or more garments per station. A counter separates the recruits from the issue bins. Fitters check the fit of their items at the end of their issue stations. Some stations have special fitting platforms as required.

4.3.3 Fitters

There are permanently assigned civilians overseeing operations on each of the phase lines. Their primary responsibility is to ensure the recruits passing through each station are properly fitted. One civilian fitter is responsible for everything within his or her station. Each fitter fits recruits sequentially in small groups and handles all miscellaneous transactions. They accurately determine the size garment for the recruit, pick the garment from the issue line behind the counter, and have the recruit try the garment on for proper size. They then carefully check the fit, select other sizes if required, and mark for alterations as required. Finally they record the size garment actually issued on the Clothing Worksheet.

Fitters are also responsible for restocking their issue lines as required. This is done mostly at the end of the day after issues are completed, but is also done periodically as workload permits during the day. No paperwork is required or processed for restocking. They also process other transactions such as zero lists, exchanges, and replacements. Finally, they readily perform other functions such as sewing and assisting other fitters to eliminate bottlenecks in the issue process.

4.3.4 Recruit Labor

Recruits are used to assist with labor tasks such as moving issued items from one processing station to another and cleaning up hangers, boxes, etc. They are not used in any critical issue or restocking processes.

4.4 Phase I Issue Process

In the Phase I Recruit Processing Center, each soldier is issued all clothing needed for weeks 1-5 of his or her respective training cycle. The soldiers are held in the nearby reception station for 4 days where they undergo administrative processing. Uniform issue is one of the first stops, just after haircuts.

4.4.1 Planning/Preparation for Recruit Processing

Recruits arrive on day 2 of their 4-day induction processing cycle. Generally at each of the CIIPs the Supervisor receives three (3) reports each day that they use to prepare for the arrival of the recruits. These include:

- **Daily Expected Recruit Forecast** – This report shows the number of recruits that arrived by week for the past and current quarters, the forecasted arrivals by day for the next 30 days, and the forecast by week for the next 4 quarters. It is in spreadsheet format and is used to plan short and long-term workloads on the issue line.
- **Roster Report** – This is a daily report listing all the recruit information required for the Phase I issue. It is received on Day 1 prior to the arrival of the recruits on Day 2. Key data includes the roster number, line number, name, SSN, Component, and sex.
- **Clothing Worksheet** – A clothing worksheet, TRADOC Form 248-R dated Dec 83 is provided for each recruit. A label with key recruit information is attached to each worksheet. The form is preprinted with a line for each item to be issued and there are columns for actual quantities and sizes issued. This line number is a key within ACIIP and is the equivalent to DSCP's procurement group code or PGC.

Before the new recruits arrive, the roster is used to make the nametapes and plates and is input into ACIIP for subsequent issue processing. Kits of belts, buckles, and other non-sized items are placed in recycled plastic bags with recruit labor to prepare for processing new recruits.

4.4.2 Initial Recruit CIIP Processing

The recruits are processed through several stations in the CIIPs to receive their uniform allotment (bag items). The initial station provides for orientation for the new recruits and includes issuance of kited items and laundry bags. Other stations for the issuance of PT clothing, BDU trousers, BDU coats, cold weather coats and related items, underwear and towels, and combat boots follow this orientation station sequentially.

Following processing through each of the issuance stations, recruits stop at the "accounting" station where worksheets recording the Phase I issues are keyed into ACIIPS. This information includes the recruit line number, and the data entry clerk verifies the ACIIPS quantity authorized and issued, including sizes and shortages.

The Supervisor later double checks the worksheets against the "Clothing Record" and corrects any errors. If errors are discovered, new Clothing Records are generated and distributed. At the end of the day, the Supervisor runs the daily ACIIPS closure process.

4.5 Phase II Recruit CIIP Issue Processing

Following completion of Phase I training, recruits return to the CIIP in week five of training for the second issue of bag items. Again they are processed through several stations in the CIIP to receive their uniform allotment. These include shoes, gloves, short sleeve shirts, slacks or skirts, coats, overcoats and caps.

During the issue activities, nametags are attached for alterations/pressing. Alteration requirements on slacks, skirts and other items are also marked and items tagged for identification and processing during Phase II issue activities. Alterations are generally completed within five days.

As in Phase I, the last station is for accounting of the issues. Recruits wait in orientation room until computer generated Clothing Records are ready to sign.

4.6 Other Issue and Exchange Activities

There are several other activities that occur at the CIIP related to uniform issue activities that must be recorded and properly accounted for during ACIIPS processing. These include turn-ins, exchanges, and special order processing.

4.6.1 Clothing Turn-in Process

These occur when a recruit does not complete training. All turn-ins are received at the CIF's Clothing Reclamation Facility (CRF). New or like-new items are sent to the CIIP for reissue. The CRF collects garments in laundry baskets by style and prepares a DA 2765 with one valid NSN for the turn in of all garments of the same style. Items are then transferred to the CIIP.

The CIIP validates the count and segregates by size. They then record the size and quantity on a local form and attach it to the DA 2765.

The Phase Line supervisor keys in the turn-in by item and size, generates a printout, and attaches a turn-in printout to the 2765 and detailed list for audit trail purposes.

4.6.2 Clothing Exchange & Replacement Process

Recruits are permitted to exchange like items in order to get the proper fitting garment. A locally produced "Clothing Exchange Worksheet" is completed by the fitter and used by the Supervisor to correct the ACIIPS balance.

The unit commander authorizes clothing replacement on a DA Form 3078, Personal Clothing Request. The recruit presents the form to the fitter who verifies the need,



collects the old item, and issues a replacement. The fitter completes the form by entering the size and quantity issued.

The supervisor keys the transaction into ACIIP from the 3078 to deduct the assets from the inventory, prints a copy of the transaction, and files a copy of each document for an audit trail.

4.6.3 Special Measurement Process

Generally the CIIPs have very few SM orders with almost none coming from Phase I. When there is a need for a special measurement process and the fitter takes the measurements, completes the manual paperwork, and forwards it for data entry.

4.6.4 Quality Deficiency Reports

Quality Deficiency Reports (QDRs) are completed for items with quality problems. The items are held in special locations for each Phase Line and processed according to established QDR policies and procedures.



5.0 IMPLEMENTATION OF QLM/LOCAL

This section provides detailed information on the activities related to the implementation of QLM/Local, the conversion of the QLM/Retail programs to support “wholesale local” inventory operations, and the lessons learned in the process. Information is also provided on the current operations of the integrated systems supporting operations today at the CIIPs.

5.1 Implementation Schedule for QLM/Local

The QLM/Local implementation activities for the four CIIPs were initiated in March 2000. The following figure (Figure 3) provides a graphic representation of the timeline for the activities related to the system implementation. As shown, the left hand side of the graphic illustrates the systems activities related to software programming, installation and training. The right hand side illustrates the related logistics support activities that were performed on a concurrent basis. T-0 was the implementation date for each CIIP with implementation activities started 12 weeks earlier (T-12). By October 2000 the system had been successfully implemented at all the CIIPs and was operating smoothly.

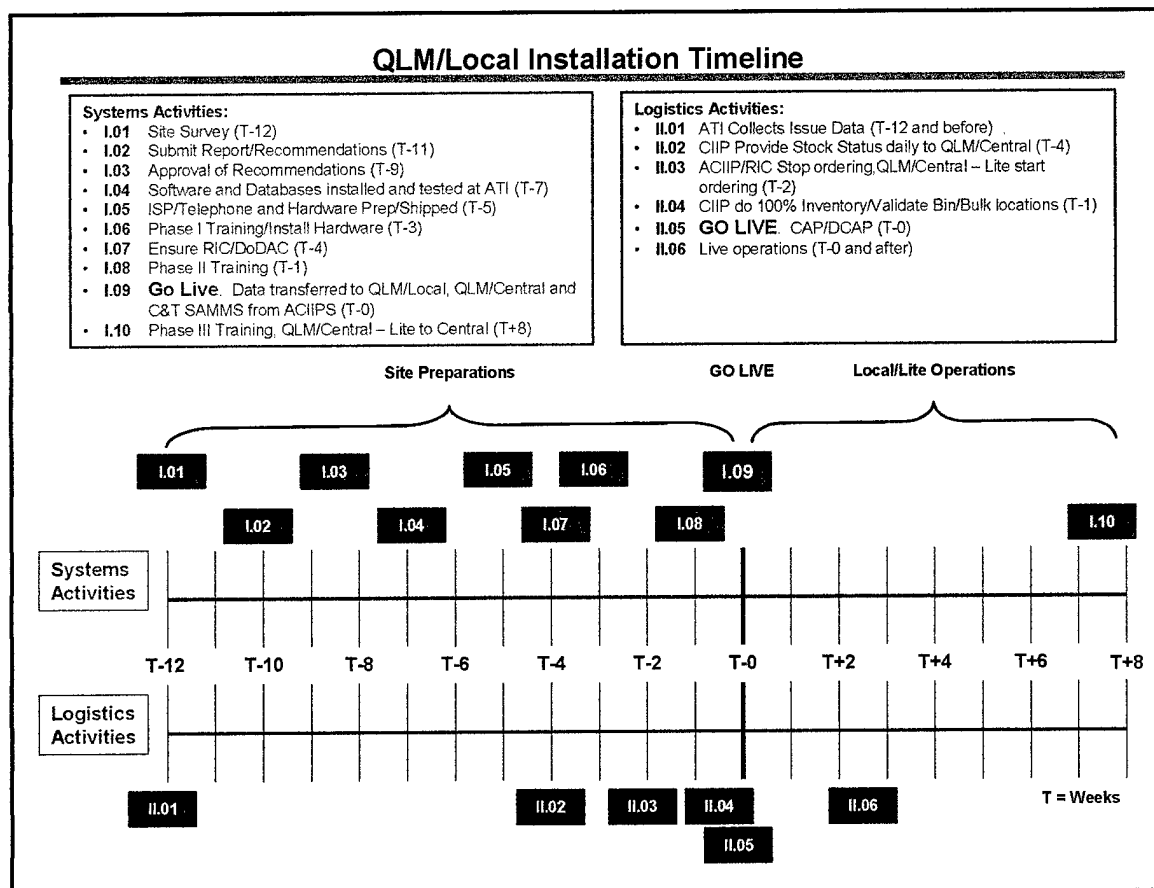


Figure 4 – QLM/Local Installation Timeline

Specific start and finish dates for implementation at each of the CIIPs from March 2000 to October 2000 are provided in the following table:

CIIP & Implementation Activity	Duration	Start	Finish
FSILL Install & Initial Visit	5 days	3/6/2000 8:00	3/10/2000 17:00
FBNG Site Survey Visit	3 days	3/13/2000 8:00	3/15/2000 17:00
FSILL Pre Go-Live	5 days	3/20/2000 8:00	3/24/2000 17:00
FSILL Go-Live	2 days	3/25/2000 8:00	3/27/2000 17:00
FSILL Post Go-Live	5 days	3/27/2000 8:00	3/31/2000 17:00
QLM/L Seminar at FLW for CIIPs	3 days	4/10/2000 8:00	4/12/2000 17:00
FKNX Site Survey Visit	3 days	4/17/2000 8:00	4/19/2000 17:00
FSILL Phase III Training	5 days	5/8/2000 8:00	5/12/2000 17:00
FBNG Install & Initial Visit	5 days	5/8/2000 8:00	5/12/2000 17:00
FBNG Pre Go-Live	5 days	5/22/2000 8:00	5/26/2000 17:00
FBNG Go-Live	2 days	5/27/2000 8:00	5/29/2000 17:00
FBNG Post Go-Live	4 days	5/30/2000 8:00	6/2/2000 17:00
FKNX Install & Initial Visit	5 days	6/5/2000 8:00	6/9/2000 17:00
FJAX Site Survey Visit	3 days	6/13/2000 8:00	6/15/2000 17:00
FKNX Pre Go-Live	5 days	6/19/2000 8:00	6/23/2000 17:00
FKNX Go-Live	2 days	6/24/2000 8:00	6/26/2000 17:00
FKNX Post Go-Live	5 days	6/26/2000 8:00	6/30/2000 17:00
FBNG Phase III Training	5 days	6/26/2000 8:00	6/30/2000 17:00
FKNX Phase III Training	5 days	7/31/2000 8:00	8/4/2000 17:00
FJAX Install & Initial Visit	5 days	8/7/2000 8:00	8/11/2000 17:00
FJAX Pre Go-Live	5 days	8/21/2000 8:00	8/25/2000 17:00
FJAX Go-Live	2 days	8/26/2000 8:00	8/28/2000 17:00
FJAX Post Go-Live	5 days	8/28/2000 8:00	9/1/2000 17:00
FJAX Phase III Training	5 days	10/2/2000 8:00	10/6/2000 17:00

5.1.1 QLM/Local System Implementation Activities

As shown in the timeline for systems activities, the key steps are clustered in site preparation activities, go-live, and QLM/Local operations. Following the initial site survey, the recommendations for the site were prepared and approved, and the hardware/software prepared (hot staged), shipped and installed. The QLM/Local server was physically installed in a location at the CIIP that was determined to be suitable for access for the required tasks of entering receipts and adjustments into QLM/Local and for transferring ACIIPS issues data.

Testing of the system software then followed these initial steps. System interfaces were tested to ensure that data was being transferred accurately and according to schedule. This included transfer of issues data from ACIIPS to QLM/Central as well as the data transfers from QLM/Local to VIM/QLM-Central "Lite" and the AAVS DataMart.

Concurrent with the installation and testing activities CIIP personnel were provided with limited initial training related to how the QLM/Local system was designed to provide

support along with changes in the use of the ACIIPS to process daily issues. This initial training provided an essential understanding of system operation and functions. More advanced training for user personnel was provided on subsequent visits as part of the Phase II just prior to and during go-live activities.

Prior to go-live, personnel initiated the daily flow of CIIP supply chain data to the AAVS DataMart and VIM/QLM-Central "Lite" and implemented the daily supply management processes set forth in the operating procedures. In effect, there were no parallel operations, and QLM/Central "Lite" was used to process redistribution recommendations from day one.

The next critical step in the process was to test the management of DSCP-owned stock at the four CIIPs with ACIIPS and QLM/Local for one month. During this period, the supply chain management results of VIM/QLM-Central "Lite" and ACIIPS were carefully monitored each day to ensure there were no significant problems with supply replenishment to meet recruit-clothing requirements.

AdvanTech personnel returned to each of the four CIIPs to provide Phase 3 Training. At this time, the focus was on close monitoring of operations, providing additional training in the new methods and procedures and building closer working relationships between DSCP, TRADOC, and CIIP personnel in managing inventories that had been converted to "wholesale local" status.

5.1.2 Concurrent Supporting Logistics Activities

At the same time the QLM/Local system implementation activities were occurring, there were other logistics activities being accomplished as shown in Figure 3 – QLM/Local Installation Timeline. The initial activities included collection of the ongoing issues data recorded at the CIIPs for the three months preceding the planned go-live date. This information was carefully analyzed as part of the process of data table build and data conversion in preparation for system activation.

In the last three months before the go-live process (See Figure 3 – T-12 to T-0) CIIP personnel worked with TRADOC to transfer the daily issues to AdvanTech for processing in the planned QLM/Local system. This information was also used in testing the conversion and modification of programs in the development of VIM/QLM-Central "Lite."

At the CIIPs preparations were under way as well. Activities included preparation for the final physical inventory to be completed as part of the system cutover. These actions were related to getting ready for completing the physical inventory and uploading data on inventory on hand at the time of transfer of inventory accountability from CIIP ownership to DSCP ownership.

QLM/Central used the issues information that was being provided on a daily basis from ACIIPS to take over inventory replenishment activities. This allowed most of the



existing dues-in that had been created by ACIIPS to be received into ACIIPS prior to go-live conversion and for the orders created by QLM/Central "Lite" to be received into QLM/Local after the conversion and go-live had been accomplished.

5.2 Data Architecture and Data Flows

A key task during the early stages of project support was the focus on finalizing data flow requirements and establishing and procuring the final hardware configuration. As part of the data flow requirements, AdvanTech worked closely with DSCP and TRADOC personnel to refine the necessary data inputs, wholesale MILSTRIP formats required, and other modifications to system capabilities necessary to support QLM/Local operational requirements.

AdvanTech's goal was to obtain the needed data from ACIIPS with a minimum of programmer involvements from TRADOC. Following the identification of essential data elements, the draft system architecture, the data flows, and the layouts for the initial data requirements for the transactions coming from ACIIPS were presented for discussion and approval for final programming modifications. The initial format requested included the item stock number (National Stock Number - NSN), date of issue, quantity issued, and account number. A related financial issue for consideration during these discussions was the Army's elimination of the stock fund accounts. These issues were handled and resolved between DSCP and TRADOC.

An additional issue that was addressed during the project was the provision of issue data from the CIIPs to the AAVS DataMart. To accomplish this, TRADOC established the programs and scripts to handle "pushing" the issues data through the ARMY firewall to an FTP site maintained by Product Data Integration & Technology (PDIT), Inc.. This was accomplished through coordination of needs between AdvanTech and PDIT.

5.3 Program Conversion & Modification Activities

The final programs and procedures were provided for data transfer between ACIIPS and QLM/Local to ASCOT and VIM/QLM-Central. As implemented, the data is "pushed" from the CIIPs into QLM/Local via the AAVS DataMart. The links go from ACIIPS to QLM/Local, QLM/Local to QLM/Central-Lite (the interim system used before a CIIP was put into production in VIM/QLM-Central), QML/Central-Lite to SAMMS, and from the AAVS DataMart to QLM/Central-Lite.

5.4 Highlights of Implementation & Support Activities

During the course of the project the AdvanTech, Inc. focus was on enhancing the QLM processes to streamline the supply support to the CIIPs, and providing on-going support services. Throughout the project, monthly reports were provided to the personnel at each CIIP as well as regular reports to Project Management. These reports detailed activities, problems, solutions and successes at the CIIPs. This includes the following sampling of events and

activities supporting the rollout-implementation of QLM/Local at Ft. Sill, Ft. Knox, Ft. Benning, and Ft. Jackson that followed the prototype at Ft. Leonard Wood:

5.4.1 Fort Leonard Wood Project Activities

- Activities consisted of providing technical and help desk services. Technical services consisted of monitoring QLM/Local processing protocols and initiating corrective actions, when required. Help desk services included over-the-phone informal QLM training, monitoring stock levels, and material expediting.
- There were 2 lines at zero balance at EOM. Actions taken to reduce zero balance conditions consisted of determining causative conditions and taking actions to eliminate the stock out and to preclude future occurrences. Actions included reviewing and changing reorder parameters, expediting material, and make system change recommendations.
- Remote support was provided during the wall-to-wall inventory at Ft. Leonard Wood.
- Fort Leonard Wood Retail Consumption Statistics:
 - Dollar Value on Hand \$4,161,534.30
 - Average Daily Usage \$82,419.69
 - Days on Hand 50.49

5.4.2 Fort Sill Project Activities

- Activities consisted of providing technical and help desk services. Technical services consisted of monitoring QLM/Local processing protocols and initiating corrective actions, when required. Help desk services included over-the-phone informal QLM training, monitoring stock levels, and material expediting.
- There were 5 lines at zero balance at EOM. Actions taken to reduce zero balance conditions consisted of determining causative conditions and taking actions to eliminate the stock out and to preclude future occurrences. Actions included reviewing and changing reorder parameters, expediting material, and make system change recommendations.
- Ft. Sill did not perform a semi-annual inventory.
- Fort Sill Retail Consumption Statistics:
 - Dollar Value on Hand \$3,247,682.80
 - Average Daily Usage \$51,982.16
 - Days on Hand: 62.48

5.4.3 Fort Benning Project Activities

- Activities consisted of providing technical and help desk services. Technical services consisted monitoring QLM/Local processing protocols and initiating corrective actions, when required. Help desk services included over-the-phone informal QLM training, monitoring stock levels, and material expediting.
- There were 4 lines at zero balance at EOM. Actions taken to reduce zero balance conditions consisted of determining causative conditions and taking actions to eliminate the stock out and to preclude future occurrences. Actions included reviewing and changing reorder parameters, expediting material, and make system change recommendations.
- AdvanTech provided onsite support during the semi-annual wall-to-wall inventory.
- Fort Benning Consumption Statistics:

- Dollar Value on Hand	\$4,020,016.85
- Average Daily Usage	\$ 119,339.43
- Days on Hand:	33.69

5.4.4 Fort Knox Project Activities

- Activities consisted of providing technical and help desk services. Technical services consisted monitoring QLM/Local processing protocols and initiating corrective actions, when required. Help desk services included over-the-phone informal QLM training, monitoring stock levels, and material expediting.
- There was 1 line at zero balance at EOM. Actions taken to reduce zero balance conditions consisted of determining causative conditions and taking actions to eliminate the stock out and to preclude future occurrences. Actions included reviewing and changing reorder parameters, expediting material, and make system change recommendations.
- Remote support was provided during the wall-to-wall inventory.
- Ft. Knox Consumption Statistics

- Dollar Value on Hand	\$ 2,863,302.75
- Average Daily Usage	\$50,547.72
- Days on Hand:	56.65



5.4.5 Fort Jackson Project Activities

- Activities consisted of providing technical and help desk services. Technical services consisted monitoring QLM/Local processing protocols and initiating corrective actions, when required. Help desk services included over-the-phone informal QLM training, monitoring stock levels, and material expediting.
- There were 8 lines at zero balance. Actions taken to reduce zero balance conditions consisted of determining causative conditions and taking actions to eliminate the stock out and to preclude future occurrences. Actions included reviewing and changing reorder parameters, expediting material, and make system change recommendations.
- AdvanTech, Inc. provided remote support for the semi-annual wall-to-wall inventory.
- AdvanTech also provided on site support to conduct an analysis of CIIP operations and data interfaces to enhance productivity and improve overall operational performance.
- Ft. Jackson Initial Consumption Statistics

- Dollar Value on Hand	\$ 6,987,901.90
- Average Daily Usage	\$119,696.62
- Days on Hand:	58.38

5.4.7 Summary Statistics August 2002

QLM LOCAL STATISTICS

	Zero Balance	ON HAND DOLLAR VALUE:	AVERAGE DAILY USAGE:	DAYS OF SUPPLY:
FORT LEONARD WOOD	14	\$6,241,266.50	\$82,425.39	75.72
FORT SILL	18	\$3,461,456.45	\$51,958.85	66.62
FORT JACKSON	24	\$7,923,243.20	\$121,260.95	65.34
FORT KNOX	15	\$3,345,230.90	\$50,536.85	66.19
FORT BENNING	15	\$4,422,527.60	\$90,566.66	48.83
MCRD SAN DIEGO	4	\$4,730,831.90	\$63,511.64	74.49
		\$30,124,556.55	\$460,260.33	65.45

5.4.8 QLM/Local System Development and Implementation Activities

- Development efforts following implementation were limited to those necessary to make minor adjustments to the system based on situations that arose during implementation (see Problem Issues below).
- Found a potential problem with multiple bin location program and will continue to test. Provided onsite and remote site support to 4 of 5 CIIPs performing the semi-annual inventory.
- Per periodic discussions with DSCP, DLA and TRADOC AdvanTech, Inc. made changes to system parameters. For example in November 2000 the ROP days for specific PGCs (“non-sized” items) was increased 60 days and the ROQ days was lowered to 30 days. This alleviated stock-outs on these items. The ROP for “end of tariff” items was set to 5, and the ROQ for “end of tariff” items was set to 5. Women items will be replenished as issues occur.
- Program modifications were made to allow the “Women” items to be replenished as issues occur.
- Modified the Recruit Returns and Exchange program, adjusted operational procedures necessary for conduct of physical inventory, and refined the ESOC policy to ensure optimal operational support. Next month will see the deployment of the Returns and Exchange program to all CIIPs.
- Finalized testing of the Recruit Returns and Exchange program at Ft. Leonard Wood and Ft. Jackson, and upgraded all CIIPs with the patch. Finalized programming and testing which provides CIIPs with the capability of recording multiple bin locations per item.
- Found a potential problem with multiple bin location program and will continue to test. Provided onsite and remote site support to 4 of 5 CIIPs performing the semi-annual inventory.
- In July 2001 AdvanTech logged-in and responded to 47 Help Desk calls from CIIPs, TRADOC and DSCP.
- A special query was written for Ft Sill so they could easily identify the “Inventory Too Low” adjustments in order to quickly correct the on hand balance problems.
- Process System Change Requests (SCRs).

Project Code	Task or SCR	Task Description	Date Completed	On Schedule	Issue #
CIIP Support	SCR00040	Modify multiple bin location program in order to delete old locations.		No	1
CIIP Support	SCR00027	Capture Due Member information.		No	2
CIIP Support	SCR00039	Process accipissues 7 days per week		No	3

- AdvanTech, Inc. assisted with ASAP Web Support by working with 11 manufacturers to provide support and encouragement in their inventory updates and to solicit their interest in using the ASAP Web DD250. Started working on bringing one new manufacturer on line with the DD 250 and completed part of the testing process.

5.4.9 Help Desk Activity

- AdvanTech, Inc. logged-in and responded to frequent Help Desk calls from the CIIPs, TRADOC and DSCP. The following are representative of the calls received:

Help Desk Log

Tracking #	Status	Application	Module	Sub Module	Description	Date Entered	Site	Resolution	Date Resolved
302	Closed	QLM Local	Stockroom	Decrement of Issues	Ft Benning called. The inventory balances are off on the 2 stock numbers that they check everyday to insure issues have been appropriately decremented from on hand balances. This is a continuation of the problem reported on Friday.	07/02/01	Ft Benning	Bob adjusted the system and made programming change to prevent requirement for date changes when scheduled tasks are rerun.	7/11/2001
303	Closed	VIM	ESOC		MCRD-SD submitted an ESOC for 8405-01-246-6658. This is a replacement for NSN 8405-01-246-6659.	07/03/01	MCRD-SD	Submitted under doc # SC01001184S001	7/3/2001



Tracking #	Status	Application	Module	Sub Module	Description	Date Entered	Site	Resolution	Date Resolved
304	Closed	VIM	ESOC		CIIP requested ESOC of 72 1537 shirts.	07/05/01	Ft Benning	Called CIIP since quantity of 72 is over 100 DOS and they have 12 on hand which is over 40 DOS. CIIP indicated that this was popular size and they had two Phase II issues and other issues in next 10 days. Also, CIIP indicated that case lot quantity was 72.	7/5/2001
305	Closed	QLM Local	System	End of Day	Ft Jackson called and their stock status did not decrement for the items that they validate everyday.	07/06/01	Ft Jackson	The QLM/Central scheduled tasks were disabled for 4th of July and were never re-enabled. Bob B dialed in and turned them back on. Sites should be fine.	7/12/2001
306	Closed	QLM Local	System	End of Day	Ft Benning called. Their stock status didn't change for the items that they check.	07/06/01	Ft Benning	The QLM/Central scheduled tasks were disabled for 4th of July and were never re-enabled. Bob B dialed in and turned them back on. Sites should be fine.	7/12/2001
307	Closed	QLM Local	System	Setup	Ft Jackson called and wanted to know what their RIC is.	07/06/01	Ft Jackson	Told site RIC is SR8	7/6/2001



5.5 QLM/Local Implementation Issues at the CIIPs

The following items were representative issues to be resolved. These items were identified during the project and were covered by the recurring progress reports. Where appropriate, notes on status have been added.

ISSUE – DSCP decision is needed on recovery and processing of Condition Code “A” clothing. This includes the size exchanges that occur for Condition Code “A” items. Once this is accomplished, automated functions and programming needs to be designed to process returns of Condition Code “A” items and exchanges of Condition Code “A” items.

RESOLUTION – DSCP Business Office personnel reviewed this issue with AdvanTech and the requirements were identified. A new function was added to QLM/Local (Process Recruit Returns and Exchanges) that allows the recruit training centers to process the “Return and/or Exchange” of Condition Code “A” items. This data is then sent to SAMMS via ASTRA. Returns are processed as D6Z miscellaneous receipts and exchanges are processed as inventory gains (D8A) and inventory losses (D9A).

AdvanTech then automated the process in the ASTRA system where the D6Z returns are reconciled against the prior issue documents. A document number representing the original Issue transaction is applied to each return. A monthly report is generated via VIM/ASTRA and forwarded to the DSCP Controllers office where the approved credit is posted back to the appropriate Recruit Center.

STATUS – AdvanTech, Inc. worked with personnel from DSCP regarding their direction on how to handle the recovery of Condition Code “A” items. System development work and reports were then coordinated and completed with DSCP.

ISSUE – DSCP mechanism needs to be defined for changes and processing of defective goods and related Condition Codes (‘BAC’ MILSTRIP).

RESOLUTION – DSCP Business Office personnel are working on this issue.

STATUS – AdvanTech awaited direction from DSCP for this issue.

ISSUE – CIIPS continue to order items on ESOC requisitions that QLM/Central has already ordered or will order before it knows that the ESOC has been placed. This has resulted in the double order of supplies that partially explains the high level of inventory at the CIIPS.



RESOLUTION – AdvanTech has modified the Special Orders program in VIM/QLM-Central. Orders are faxed to AdvanTech and are then input into the Special Orders program. These orders are then processed with the Suggested Order List orders and as a result are assigned a document number. This is then reflected in QLM/Local as a valid Due-In. AdvanTech has developed a reporting mechanism to determine the level of non-QLM/Central orders being placed. These numbers will be reported monthly. AdvanTech will also continue to work with the CIIPS to reduce the number of these orders. DSCP will develop guidelines to also minimize the amount of ESOC Orders.

STATUS – An on-going review is conducted with monthly reports to DLA/DSCP. ESOC activity appears to be down.

ISSUE – Procedures and Policies for Physical Inventory

RESOLUTION – DSCP owns the material at each CIIP. CIIPS were familiar with TRADOC guidelines and new DLA guidelines needed to be developed. AdvanTech worked with DLA and TRADOC to develop an ARN policy for conduct of the physical inventories.

When physical inventories are scheduled, a DSCP representative who must sign off on the accuracy of the actual counts monitors activities at each Recruit Center. The resulting counts are processed through ASTRA where they are compared against the “Qty-on-Hand” in SAMMS. After review and approval by DSCP Management, ASTRA then computes the inventory adjustments, and format them in to D8A/D9A MILSTRIP transactions. These transaction sets are then electronically transferred (ftp) to SAMMS.

Currently the Reconciliation Process responsibilities are shared between DSCP and the Recruit Center Personnel.

STATUS – Procedures were developed for physical inventory and the reconciliation processes.

ISSUE – Processing Issues 7 Days per Week

RESOLUTION – TRADOC would like to be able to process an end of day in ACIIPS and send the issue data to ASTRA 7 days per week. Currently that cannot happen. If data is sent on Saturday or Sunday, the previous day’s issue data will be overwritten. AdvanTech needs to change the processing within ASTRA to preclude overwriting of data.

STATUS – A procedure was developed for the Reconciliation process



5.6 Conversion & QLM/Local Go-Live

The following trip summaries are representative of the preparatory steps and the implementation steps at one of the CIIPs (Ft. Jackson).

Preparatory Trip Summary and Steps:

- The initial activity included unpacking and setting up the QLM Local system hardware. Each component was individually tested. A Fort Jackson-supplied UPS power strip was initially used but appeared to be faulty, so AdvanTech purchased a new UPS. The new UPS functioned properly but occasionally indicated that the power supply, in the available electrical circuit, was inadequate. This was reported to CIIP personnel and a service call was placed to the Maintenance Department. Overall, the problem appeared minor and did not hamper installation and testing. Resolution of the power situation must be completed prior to go-live week.
- A system function and capabilities overview meeting was held with Essie Smith and Kaye Robbins. Several questions, including the conduct of the pre-go live inventory were raised. Essie Smith indicated that the pre-go live inventory would take place during the time period 17-20 August 2000.
- An Internet connection was established with BellSouth Communications. This connection was tested and is operational. The telephone line was set up at Fort Jackson for the Internet connection. This phone line operates through the base telephone system and due to the amount of traffic through this system, access in and out is difficult during normal business hours. Phone connectivity could be broken by higher priority calls or be unsuccessful due to a high volume of traffic. This has the potential of impeding access to the Ft. Jackson QLM Local computer. Since most access will occur after normal business hours, it should not degrade data transfers to/from other ARN systems; however, access via PCAnywhere to conduct routine updates and other tasks, may need to be done after hours or on weekends.
- The remote PCAnywhere connection failed connectivity tests. The software will be reinstalled and tested prior to Go-Live.
- ASCOT user name and password was loaded.
- The importance of entering the recruit budget (forecast) and recruit actual numbers into QLM Local was discussed with knowledgeable personnel. Both numbers are available to the CIIP. Explained how QLM Local uses that data to compute quantities to order.
- Provided basic menu and screen training to System Administrator, Kaye Robbins. Due to the small number of personnel who will have access, it was



decided to do most of the training during go-live and post go-live periods. Login and passwords were assigned each user.

- Reviewed those screens that require review, validation, and updating prior to 22 May 2000, pre-go live week. Those screens are the Weekly Recruit Forecast (expects), Recruit Actual, and the Standard Issue Tables for various categories of trainees. Kaye Robbins will accomplish this
- Bin Locations were not loaded to QLM Local databases. These can be entered into ACCIPS prior to go-live, and transferred to QLM Local during go-live procedures, provided the ACIIPS database was current.
- Fort Jackson Activity Address Code (SC0137), Routing Identifier Code (SR7), FTP login protocols. Cost Centers for Army units are Recruit Training Center specific. These will be entered, with the assistance of Dawn Hustus of TRADOC, just prior to go-live. Users Manuals were provided for reference. Telephone numbers for Bob Padilla and AdvanTech, Inc. were provided to CIIP personnel.

Preparatory Trip Concerns, Observations, and Recommendations.

- Ms. Smith, CIIP Supervisor, was concerned when QLM Local would take over ordering of clothing items because recruit summer surge does not end until September 2000. Explanation of the redistribution process under QLM Central and Local was explained.
- CIIP personnel were concerned on whom to call for critical shortages uniform items. They were instructed to call John Reavey at DSCP.
- When will data uploads and downloads be accomplished? Data uploads times were discussed and set to occur after normal business hours.
- Phone connectivity is poor, due to the telephone line being part of the Ft. Jackson telephone system. Connectivity to the Internet, or attempts to dial in to the QLM Local computer may be unsuccessful due to the high volume of telephone traffic at Ft. Jackson, or could be pre-empted by higher priority calls. Recommend that in future installations, consideration be given to utilizing a commercial telephone line that does not route via base exchanges. Installation and testing was impeded due to poor telephone communication capability.
- The noise and distraction level in the CIIP office, where the QLM Local workstation was installed, is very high. Traffic and interruptions by other CIIP workers, recruits, and drill sergeants was constant throughout the workday. CIIP personnel were enthusiastic about using QLM Local.

Implementation Trip Summary:



- Inventory/purging system delayed completion of inventory, decap/cap. The CIIP conducted it's decap inventory August 17-20. The CIIP had not purged (archived) its ACIIPS files for an extended period of time, and the purging process took from the afternoon of August 19 until the early morning of August 21. Although this process was very lengthy, it did not impede the conversion process.
- Tasks to be completed by CIIP personnel were accomplished. The Expects table (recruit shipping plan) was updated with best available data through the end of December 2000. The Standard Issue Tables were verified as correct.
- Cost Center data (DODAACs) were updated by Bob Padilla with information provided by the CIIP. Each CIIP has assigned different DODAACs to charge uniform costs against for issues to Regular Army, Reserve Army, and various National Guard funding data.
- Users Manuals were provided during the previous visit.
- Trained primarily Kaye Robbins, as she will be the primary individual responsible for QLM input. She will provide "train-the-trainer" training to one or two other individuals to process receipts.
- The QLM Local computer assets were inventoried and Essie Smith signed a custody record that will be forwarded to AdvanTech, Inc.
- The Scheduled Tasks were set up to commence operations at 11 pm on August 22. Although no data was transmitted August 22, the tasks appeared to process correctly.
- The previous connectivity problem with the PCAnywhere, which allows AdvanTech personnel to access the QLM Local computer, was corrected. A new copy of the PCAnywhere program was purchased and reinstalled, but did not correct the problem. Phone calls to PCAnywhere technical representatives eliminated the PCAnywhere program as the source of the problem. A call to technical representatives of the modem company isolated the problem to missing/incorrect connection setting. The setting was corrected and tested successfully. For documentation purposes the following steps were followed to correct the connection setting problem:
 - o Click on Control Panel
 - o Select Modem and double click
 - o Highlight the SupraExpress SUP2730 modem and click Properties
 - o Select the Connection tab and click the Advanced button
 - o In the Extra Settings box type in "at&fs0=3+ms=11"
 - o Close out the boxes by clicking OK

- A spreadsheet containing proposed Reorder Points (ROP) and Reorder Quantities (ROQ) was provided for CIIP personnel to review. These ROP/ROQ figures were computed using actual issue data that the Ft. Jackson CIIP provided. After review by CIIP personnel, these initial ROP/ROQ quantities were deemed satisfactory. The ROPs were set at approximately 50 DOS and the ROQ at 20 DOS. They will be monitored and adjusted accordingly.
- The electrical circuit in the CIIP building continues to cause the UPS to indicate that the power supply is problematic. Since the previous visit, the UPS has periodically activated and after 10 minutes of battery power, the computer turns off. CIIP personnel have had to reboot the system. Base maintenance personnel have checked the electrical circuits and found no deficiencies but are considering installing a separate electrical circuit for the QLM Local computer.
- The CIIP completed processing the decap inventory and the Stock Master, NSN By Line, and other files were sent to the FTP site Tuesday night, August 22.
- Decap/cap dollar value: \$7,592,375.80.
- The QLM Stock Catalogs created by CIIP supplied data, contains two items, which have locally assigned NSNs. They are Nameplates and size 11XL dress coat. The nameplate is a locally made item and the dress coat is being replaced. They were assigned an ABC code of "X" and the ROP/ROQ was set at zero.
- CIIP submitted 385 requisitions last week for critical shortages, which was in last two weeks when CIIPS were not supposed to order (they were supposed to have ensured they had sufficient stocks to take them thru last two weeks before conversion to prevent these types of orders). Orders forwarded to John Reavy who returned them with no action. CIIP concerned about getting this order processed.
- CIIP also has several critical shortages due to inventory results that they need to reorder/receive quickly.
- CIIP personnel indicate that there are 12 NSNs for new items that are not in SAMMS and are concerned how to order.
- Conducted system administrator and user training on menu options, keying primarily on processing receipts and inventory adjustments. Sandy Gilbert received system administrator training, and user training was provided to Valerie Sikes, Barbara Harmon and S. Triplett.
- "Go-Live" was successfully executed Wednesday August 23, 2000.

5.6.1 Initial QLM/Local Inventory Values

QLM/Local officially went live at Ft. Leonard Wood on 25 January 2000. The initial inventory level was \$2,932,584.10 (equivalent to 31 annualized days of stock on hand). While the conversion to QLM/Local went smoothly, Ft. Leonard Wood personnel had allowed inventory levels to drop too low just prior to the conversion and QLM/Central-Lite had to generate redistributions for 93 items the prior week to minimize stock shortages at the CIIP.

In February, QLM/Local continued to operate smoothly at Fort Leonard Wood and the month end inventory value was \$4,321,362.05 or about 56 annualized days of supply. As per the original plan, QLM/Central-Lite was using the reorder levels that were transferred over from ACIIPS-R at conversion. These levels continued to be used until QLM/Central had accumulated 2 full months of usage data. At that time, QLM/Central began to automatically recalculate the reorder levels.

QLM/Local continued to operate smoothly at Fort Leonard Wood in March 2000. The month end inventory values remained stable and were monitored by DSCP and AdvanTech on a daily basis. The following section on Metrics provides detailed information on the performance levels during this period of time.

5.6.2 QLM/Local Receipt Processing

During the early weeks after the go-live, one of the questions that came up was the speed of processing of receipts into the new system. AdvanTech personnel extracted data from SAMMS and QLM/Local to determine the amount of time that followed receipt of the items at the base before Army personnel were entering the receipts into QLM/Local. The chart below shows how quickly the receipts were being entered into QLM/Local after the receipt occurred in February 2000 just after the system had become operational.

Number of Days to Enter Receipt	Receipts Processed	Percent of Total
0	73	42.44%
1	47	27.33%
2	0	0.00%
3	37	21.51%
4	12	6.98%
5	2	1.16%
6	1	0.58%
7	0	0.00%
8	0	0.00%
9	0	0.00%
10	0	0.00%

Total	172	100.00%
--------------	------------	----------------

Table 1 – Ft. Leonard Wood Receipt Processing Analysis

5.7 Continuing Operations of ACIIPS/R and QLM/Local

Today, apparel supply chain operations at Ft. Sill, Ft. Knox, Ft. Benning, and Ft. Jackson are managed with an integrated approach using ACIIPS, QLM/Local and VIM/QLM-Central Operations. ACIIPS today continues to provide transaction registers of the daily issues to recruits and also several standard reports documenting financial transactions. The operational tables (databases) for ACIIPS are erased at the end of each month and only limited information is carried forward. The reports available provide visibility to the Army for planning and budgeting purposes.

ACIIPS/R (the revised version of the ACIIPS software installed during 1999) provides daily and historical data on soldier issues with the CIIP personnel controlling the ACIIPS/R server. The contemporary issues information is reported on a daily basis and passed to AdvanTech at the FTP site for QLM/Central processing and transfer to SAMMS via the DSCP Clothing & Textile server ASCOT.

ACIIPS/R also is used to maintain a dues-out file for soldier dues-out that are created when an item is not in stock and available for issue during recruit processing. The ACIIPS/R allows personnel to reprint the soldier clothing record and provides on-screen help.

QLM/Local provides the core functionality necessary to manage the “wholesale local” inventories. The local stockage levels are mirrored to QLM/Central with receipts and issues information merged from the integrated systems on a daily basis. Periodic inventories and spot checks have been implemented to ensure that the data from the different systems remains in synch and issues and receipts are being recorded properly.

VIM/QLM-Central now takes the ACIIPS Issues data provided by the four CIIPs and converts the aciipsissue.txt files into A0A data. This information is subsequently sent to the four CIIPs from the FTP site, and ACIIPS then converts the A0A data provided by VIM/QLM-Central into the required T23 format for transfer to STANFINS/DFAS for financial accounting and payment processing.

AdvanTech provides on-going support today for QLM/Local operational management with an experienced RTC Supply Manager. AdvanTech’s staff performs monitoring and adjusting of stockage levels on a daily basis with support and coordination to DSCP personnel. In this role, AdvanTech facilitates the activities of the Item Managers until the QLM/Local and VIM/QLM-Central systems are transferred to DSCP. In addition to working closely with DSCP, AdvanTech also regularly reviews system and supply chain assessments made by the RTC Supply Manager. AdvanTech then recommends/makes changes to system parameters and operating procedures to enhance the supply management process.

5.8 Lessons Learned During QLM/Local Implementation

As with any new system, there were numerous difficulties and issues encountered that had to be resolved as efforts progressed. The following items highlight the key lessons learned that needed to be considered for future ACIIPS – QLM/Local conversion and rollout efforts.

5.8.1 Initial Code Set-up

DSCP must assure that all RIC, DODAAC, and any other required codes are created/assigned and operational prior to going live. This will minimize problems and will facilitate initial startup activities. AdvanTech compiled a list of essential discussion points and a checklist for use in implementation planning at subsequent sites (see Appendix).

5.8.2 Inventory Draw-down Levels

Future RTCs involved in rollout and conversion from existing operations to “wholesale local” inventory should not reduce inventory to the “danger” level to meet capitalization/de-capitalization requirements. This will prevent unnecessary shortages and prevent/minimize expediting of inventory replenishment orders.

5.8.3 Shipping Plan/Predictive Forecasting Inventory Replenishment

Training needs to describe and emphasize the importance and impact of “order based on shipping plan” material flow including both management and warehouse personnel. This flow anticipates surges (predictive forecasting) and ships materials into the warehouse in anticipation of needs.

At the beginning of each month, the “shipping plan” information should be updated since it is used to generate the requirements for the month following the current month. At Ft. Leonard Wood, personnel indicated they extract information from RECBAS for shipping plan updates and make adjustments based on their personal knowledge of what they can expect to actually occur.

5.8.4 Physical Inventory Processes

Formal inventories were conducted semi-annually prior to conversion to “wholesale local” operations. Informal inventories are conducted when a fitter feels his inventory is getting too low or there is an unexpected stock out. These problems occur infrequently and are normally resolved quickly with the complete audit trails that are available. Both of these approaches – formal wall-wall and informal spot-checking or cycle counting – should be considered as routine procedures for other RTCs if comparable processes are not already in place.

Under ACIIPS, different individuals made multiple counts until at least two counts match, and inventory control was tight with only $\frac{1}{2}$ of 1% variance allowed on total dollar sales of \$30,000,000 annually (allowable variances are one-half of one percent of sales each six months). Ft. Leonard Wood never had any problem meeting this requirement in the past and did not anticipate any problems in the future with the new systems.



6.0 Automated Receiving Development & Proliferation

6.1 Automated Receiving Project Overview

Currently there are 2 systems in place (at each CIIP) that provide data, which directly affects the on-hand inventory balances of the line items stocked at the CIIP. The legacy Army system, ACIIPS, captures the issues, which are processed through QLM/Central and sent back to QLM/Local in a batch process each evening.

The second system, QLM/Local, records the receipts, inventories and adjustments. The business practices employed at each CIIP and the timing of data transfers between these two systems is critical to the accurate and efficient management of DSCP's assets.

One example of a business practice with data transfer implications that has been adversely affecting the inventory balances at the CIIPs is the receiving process. Receipts are physically received into the warehouse and placed on the issue lines or in the warehouse throughout the workday.

The receipt paperwork may not be processed into QLM/Local until that evening or the following day. If receipts are physically in-processed but not input/batched into the QLM/Local system before the issues are recorded in ACIIPS and subsequently decremented that night in QLM/Local, there is a potential of a negative inventory balance. If a line item is issued without sufficient quantity recorded in QLM/Local to cover the issue, QLM/Local will automatically adjust the on-hand balance (by processing an inventory adjustment gain) to compensate for the ACIIPS issue quantity, and will then adjust the quantity back down to reflect an inventory loss due to an issue from QLM/Local. The receipt is then processed the next business day (for supplies that were already issued). The inventory balance in QLM/Local will reflect a higher quantity than truly exists on the shelf.

A short-term project (STP) was instituted to investigate alternatives and develop a solution. The STP provided for: 1) Complete Business Process Review and Systems Interface Assessment, and 2) Automation of the QLM/Local receipt process in order to gain near real time data updates.

The business process review and systems interface assessment evaluated and reported on the business practices and system interface issues in place that may be adversely affecting the inventory balances and the operation of the CIIP, and recommended solutions to these problems. Automating the receiving process will provide the speed and accuracy that the CIIPs require during heightened activity of the summer surge and winter exodus. This should significantly reduce the inventory discrepancies that have been rampant in 3 of the 5 Army CIIPs.

It is believed that by automating the receiving process, time consuming and error prone batch processes currently in place at each CIIP can be eliminated and potential timing problems associated with the use of 2 different systems used to record receipts and issues can be eliminated. The prototyping analysis and development was performed at AdvanTech, Inc.



corporate offices and the deployment and testing effort was based out of the Fort Jackson S.C. CIIP. Feasibility of applying the automated receiving process to other CIIPs and MCRDs as well as applying the other recommendations from the operations assessment was provided. See Appendix E for details.



7.0 Technical Approach for QLM/Local Rollout to CIIPs

The Technical Approach is presented in this section. It provides a summary of the individual tasks and activities in each of the key project activities accomplished associated with the rollout to the four CIIPs.

7.1 Initial Site Visit & Requirements Assessment

7.1.1 Coordinate Site Visit Schedule with TRADOC & RTC – Site visit planning for each RTC was coordinated with TRADOC and RTC personnel responsible for CIIP operations.

7.1.2 Provide Initial Briefing to Personnel at RTC on Site Visit Goals – This activity provided for an overview briefing of current RTC support at other sites including the FLW CIIP activities and Apparel Research Network support to MCRD-San Diego and Parris Island. The briefing highlighted the goals and specific project objectives and anticipated benefits to be achieved. This initial briefing also provided the opportunity to review the following issues with RTC supply chain personnel:

- Understand management's overall inventory and order management systems concepts and requirement;
- Understand management's views on what future, more cost-effective systems should look like; and,
- Identify any major system problems at the RTC that need to be solved to ensure each recruit obtains the right items on time.

7.1.3 Identify Primary Contact & System Administrator at the RTC – This task provided for identification of the primary Point of Contact and the individual(s) that subsequently provided primary operational support for QLM/Local use at the RTC. These individuals were briefed on operating activities at the prototype site (FLW) and RTC training and implementation activities related to subsequent QLM/Local installation/implementation.

7.1.4 Designate Implementation Work Group at the RTC – This task provided for identification of the personnel to be involved in discussion of any suggestions or recommendations developed by TRADOC, DSCP, or AdvanTech as a result of prototype implementation activities completed at FLW. This included review of procedures and operational support issues at the specified RTC as well as information related to support from DSCP or local vendors. This provided the foundation for the subsequent tour and implementation support activities related to logistics operations to be assessed and discussed with site personnel. Activities identified for consideration included:

- Storage area layouts;



- Receipt and issue activities;
- Operational functions/systems used locally to support bag item issue to recruits as they are processed at the specified site.

7.1.5 Tour RTC Facilities & Identify QLM/Local Operating Requirements – This task focused on a walk-through tour of existing facilities used for receiving, storage and issue activities. Each RTC tour should also included review of operational support/administrative areas and identification of locations for future placement of equipment/hardware provided.

7.1.6 Gather Preliminary Clothing & Textile Inventory Data – This task will provided for the initial collection of any relevant site specific information related to storage areas (location code requirements), stockage levels maintained, etc.

7.1.7 Conduct Exist Briefing – This task provided for a summary briefing and review of findings from the site visit and assessment activities. Also, personnel discussed any preliminary recommendations for implementation activities.

7.1.8 Prepare & Submit RTC Site Visit Report – This task provided for a summary written report prepared to document the findings and issues discussed during the RTC site tour, interviews, and briefings. The Site Visit Assessment Report was distributed as directed to personnel as designated at DLA/DSCP/TRADOC.

7.2 Set Up QLM/Local for Each RTC CIIP

7.2.1 Set Up/Hot Stage QLM/Local Server – This task provided for the essential activity of hot-staging the hardware in preparation for the subsequent installation at the RTC and the related go-live activities. When the server was received from DSCP it was initially set up at AdvanTech for the planned/standard installation configuration by “hot-staging” the equipment and software configuration prior to shipping the equipment to the site for permanent installation. This included loading and testing application software.

7.2.2 Set Up & Test Site Specific QLM/Local Database – A key part of the preparations was establishment of the RTC specific database including the ability to incorporate existing issue data and to ensure that there were no outliers in the database for the specific site. This also involved validating the amount of stockage required to properly convert the existing inventory to wholesale inventory without adverse impacts on operational support at the RTC.

7.2.3 Validate QLM/Local Database & Research/Resolve Problems – This activity focused on reviewing the data base information related to the specific RTC on a daily basis for 10-12 weeks prior to the go-live conversion to build a history of stockage parameters required and historical usage. This served to highlight any problems that might otherwise arise during the go-live period by providing for analysis of the local



information and issues and set-up preliminary database for site-specific QLM/Local requirements.

- 7.2.4 Update Site Specific QLM/Local Database Information Weekly** – During the 10-12 weeks leading up to the go-live period, personnel updated the local database information on a weekly basis and monitor stockage levels, identify concerns, and research and resolve issues.
- 7.2.5 Establish RTC CIIP Local ISP & Commercial Phone Support** – This task provided for the essential establishment of communication linkages for future support.
- 7.2.6 Package & Ship QLM/Local Hardware to RTC CIIP** – This task provided for packaging and shipping the previously hot-staged hardware to the RTC site in preparation for installation and system implementation prior to the go-live conversion.

7.3 Set Up QLM/Lite for Each RTC CIIP

This task was performed on a “rolling basis” for multiple RTCs (i.e., QLM/Lite for RTC "A" rolls to QLM/Lite for RTC "B", etc.

- 7.3.1 Set Up Data Management & Implement "Parallel Monitoring"** –This activity provided for “parallel monitoring of site specific requirements to ensure continuity of supplies as the site inventories were reduced prior to conversion to single stock-fund and the completion of the go-live activities. The systems were operated for a minimum of one month to ensure that the stockage levels would provide timely replenishment and management data to the DSCP Item Managers.
- 7.3.2 Monitor & Evaluate Supply Management Requirements** – Personnel monitored the supply management requirements for each RTC CIIP to ensure stockage levels were properly defined.

7.4 Installation, Initial Training & "Go-Live" Support

These activities were related to the actual installation of the QLM/Local software and hardware at the RTC CIIP operational area.

- 7.4.1 Install QLM/Local Server** – This task provided for the initial set-up of the hardware and software previously hot-staged and shipped to the RTC. The physical installation of the QLM/Local server was placed in a location determined to be suitable for access for the required tasks. This location was generally in the office of the Supply Manager or his designated assistant responsible for local operational support.
- 7.4.2 Install & Test Communications Interface (Remote Support)** – This activity provided for testing the local communications interfaces required to support daily operations and

remote maintenance and help desk activities. System installation personnel connected communication linkages to the QLM/Local server and conducted testing to certify that the data transfer interface was operating and that the data was being transmitted through QLM/Local to the AAVS DataMart and VIM/QLM-Central "Lite."

7.4.3 Conduct Initial User Training & Implementation Support – This was the critical preparation for go-live activities and included on-site orientation and training in QLM/System operation and establishment of the local procedures that were used on a daily basis to maintain support following go-live.

7.4.3.1 System Operation Training – During the user training, personnel at the RTC CIIP were provided with initial training in how the system was to be operated to provide support in "mirroring" daily activities from ACIIPS. This training provided essential understanding of system operation and functions so that subsequent go-live" activities could be completed successfully. A related activity was to provide support for "table build and data conversion" activities for the local site-specific requirements, e.g., bin/bulk locator codes, receiving flows, and related operational issues.

7.4.3.2 Initial Inventory – Other activities completed during this period include support for completion of the initial inventory activities. The QLM/Local system installation personnel provided advice and guidance on an "as requested" basis to ensure inventory was properly counted and entered into the QLM/Local database. RTC CIIP personnel were responsible for completing an accurate inventory and loading the data into the QLM/Local system at the time of transfer of inventory accountability from the RTC CIIP ownership to DSCP ownership.

7.4.3.3 Document Conversion Support & Monitoring – An additional activity was the careful implementation support and monitoring of document conversion activities. AdvanTech provided support and guidance to RTC CIIP personnel to ensure appropriate conversion of existing open requisitions and related support documents from "RTC ownership" to "depot re-supply" actions with the RTC CIIP ownership transferred to DSCP asset accountability.

7.4.4 Prepare Site Implementation & "Go-Live" Report – At the completion of the initial training, implementation and go-live support, a report was prepared documenting lessons learned including problems encountered and recommendations to be incorporated in future support activities for future sites.

7.5 Documentation

Each site received the necessary documentation to manage the QLM/Local system including hardware and software documentation. The documentation ensured the integrity of the daily data transfer cycles, and that the management of the RTC CIIP supply chain was performed in a structured manner each day.



7.5.1 Provide System/User Manuals for each Site – Each site received system user manuals during the implementation and training activities.

7.5.2 Provide System/User Manuals Updates as Required – Documentation was updated as necessary to reflect any enhancements, modifications, or upgrades to both system and applications software.

7.6 Post Implementation Training & Support

7.6.1 Conduct Post Implementation User Training & Site Support – This task provided for a limited amount of support after the go-live period to ensure that all new procedures were properly implemented and followed on a rigorous basis to ensure accuracy on inventory management and re-supply functions.

7.6.2 Prepare Post Implementation Training & Site Support Reports – This task provided for limited reports to be prepared after post implementation and support provided to ensure that “lessons learned” were documented to benefit future implementation activities.

7.7 Operational Management & Maintenance

7.7.1 Initial Management of DSCP-Owned Inventory – AdvanTech staff provided support in performing, monitoring and adjusting of stockage levels on daily basis for three months following the “go-live” as directed and authorized by DLA program management with optional support available after that time.

7.7.2 Operational Management Advisory Support – AdvanTech had a limited role in managing the DSCP-Owned inventory after initial go-live and post-implementation support. Based on system and supply chain assessments made by the DSCP IMs and the RTC CIIP Supply Manager, AdvanTech made changes to system parameters and operating procedures to enhance the supply management process.

7.7.3 File Conversion QLM/Lite to QLM/Central – This support provided for the full conversion of the QLM/Lite system and files used for initial support to integration with and operation through Qlm/Central.

7.7.4 System Change Requests – Updates & Modifications – A limited amount of support was provided to support resolution of any problems that were encountered at each site as a result of lessons learned at preceding sites, and system upgrades from hardware/software vendors, e.g., Microsoft NT service releases, or modifications to hand-held terminal code used for processing receipt information. This included the reporting of findings and issues through the SCR Process. This process required submitting System Change Requests (SCRs) as



necessary to correct any software deficiencies in order to solidify the prototyping development process.



8.0 Technical Approach for On-going Support to CIIPs

8.1 Conduct Training and Physical Inventory Support to New Commercial

Contractors – Support was provided to CIIPs as directed by the Program Manager.

8.2 Support of Annual CIIP Physical Inventory Process – Assistance in the processing of annual physical inventories at CIIPs was provided.

8.3 Provide Support to DSCP in the Establishment of a Standard CIIP Location

System – Assistance was provided to DSCP in evaluation of a standard location system to be implemented at all CIIPs. For the purposes of this STP, activity was focused on providing information about the best implementation of a location system relative QLM/Local.

8.4 Provide training and assistance on inventory management practices and daily QLM tasks – Assistance was provided to DSCP and CIIPs with the daily routines to ensure all issue data was properly formatted and sent, user designed reports, receipts processed on timely basis, inventory adjustments appropriately processed, and training on weekly random physical inventories.

8.5 Provide ASAP Web Support – Assistance was provided to manufacturers in the population of their data into ASAP Web.

8.6 Management Reporting – Monthly Interim Progress Reports, and Monthly Contract Funds Status Reports were produced.



9.0 Technical Approach for Automated Receiving

The following tasks were completed in the support of evaluation of requirements and development of enhanced capabilities for automated receiving at the CIIPs.

9.1 Research CIIP Operations and Determine Opportunities for Enhancement – Conducted a business process review and a systems review at the Ft. Jackson CIIP and determined the opportunities for enhancement.

9.1.1 Analysis of Ft. Jackson CIIP Operations and Data Interfaces – Conducted a business process review and systems review to determine any processes or systems requirements that would adversely affect the operations at the Ft. Jackson CIIP.

9.1.1.1 Write a report of the findings and recommended solutions.

9.1.1.2 Feasibility Study of Applying Recommended Solutions Across all CIIPs and MCRDs – Created a report detailing the applicability/feasibility of employing the recommended solutions to all CIIPs and MCRDs.

9.1.2 Industry Research – Performed an industry search to determine available product lines to automate the receiving process and costs associated with Wireless Technology, Use of Smart Handheld Terminals, and determine best processes.

9.1.3 Benefits analysis – Based on results from the industry search, determined the potential implementation benefits and costs at Ft. Jackson, S.C.

9.2 Develop Prototype Software Solution to Automate the CIIP Receiving Process – Initial prototype development of the software solutions necessary to automate the receiving process at each CIIP was completed. This included the following sub-tasks.

9.2.1 Handheld Terminal Programming Changes – HHT software changes required were developed and programmed including routines for: (1) receiving the active due-in file from QLM/Local, (2) processing a receipt using the HHT against the active due-in file, (3) transmission of the updated receipt file to QLM/Local.

9.2.2 Modifications to QLM/Local – The following modifications were made:

- Receipt Processing Program to accept data from HHT
- Develop a validation and editing program to handle exceptions
- Program modification to update Stockroom Catalog
- Program modification to update Receiving Database table, and
- Program modification to generate D6K, D6L MILSTRIP transactions.



9.2.3 Test HHT and QLM/Local Modifications

This included the following:

- Software Testing
- HHT Testing
- Wireless IP Connectivity Testing

9.2.4 Update of System and User Documentation – Modification of both the System Manual and the User's Manual to incorporate changes required reflecting hardware maintenance and troubleshooting and process changes.

9.3 Deploy Prototype Software to Ft. Jackson, S.C. – This task included implementing the necessary network hardware and load software.

9.3.1 Stage Hardware –HHT hardware was staged at AdvanTech corporate office for necessary software modifications prior to shipping HHT's to Ft Jackson for the deployment.

9.3.2 Test Transmission – AdvanTech coordinate transmission testing with site personnel and AdvanTech corporate personnel.

9.3.3 Load Software –QLM/Local prototype software was loaded on the QLM/Local server at Ft. Jackson.

9.4 Test the Deployed Software at Ft. Jackson S.C. –The solution was implemented at Ft. Jackson and tested.

9.4.1 Train Users – AdvanTech provided instruction to CIIP warehouse personnel on the proper use of the HHT, troubleshooting techniques, and validation procedures.

9.4.2 Observe Operations – AdvanTech observed CIIP personnel as they used the automated process during receipt processing and provided training as required to ensure proper techniques were utilized by CIIP personnel.

9.4.3 Report Findings thru SCR Process – SCRs were submitted as necessary to document and correct any software deficiencies in order to solidify the prototyping development process.

9.4.4 Modify Software as directed by the Program Manager – Software engineering changes were accomplished as the Program Manager approved SCRs.

9.5 Management Reporting – Monthly Interim Progress Reports, and Monthly Contract Funds Status Reports were produced.



- 9.5.1 Monthly Interim Progress Reports** - Provide interim progress reports to the Project Manager and the VPV participants were provided as directed.
- 9.5.2 Monthly Contract Funds Status Reports** – AdvanTech provided regular monthly reports tracking expenditure of funds authorized.

10.0 RESULTS ACHIEVED & METRICS

This section provides summary information on the results that were achieved at the CIIPs to-date. It is important to note that the support has not ended with the completion of this project and that refinements continue to be made to fine-tune operational support and efficiency of the supply chain activities.

10.1 Operational Objectives & Results

There were several objectives defined at the start of the project. The desired results from new systems included the following:

- **Asset Visibility –**
The ability for DSCP to efficiently see all data is required to meet ARN's objective to "see" on-hand inventory data regardless of the location at the RTC. This is the core functionality required as an essential aid to decision-making and has been successfully accomplished.
- **Legacy Interface –**
The ability of the ARN solutions/software to work efficiently with existing external systems to meet current military department requirements was a key requirement, and has been successfully accomplished.
- **Current Information –**
The ability of the proposed solution to provide access to current information on an as needed (i.e., timely) basis has been successfully accomplished.
- **Improve Operational Efficiency –**
This criterion provides an estimate of the potential impact of the proposed solution to enhance the efficiency of the CIIP's operations. This includes impacts on personnel support requirements for data collection, processing and materials handling activities. This has been successfully accomplished, and additional improvements including the use of automated data capture (bar code labels and hand held bar code scanners) capabilities are in process of being implemented in the follow-on support and maintenance activities.
- **Improve Effectiveness –**
The potential impact of the proposed solution to have a favorable impact by supporting the management decision-making process – both at the CIIPs and DSCP, and this has been successfully accomplished. An example would be enabling minimum total inventory with lowest stock outs.

10.2 Inventory Management Metrics

The Fort Leonard Wood Basic Training Command processes in excess of 25,000 soldiers per-year. Of these, roughly 70% are male and 30% female. As at other Recruit Training Centers, the busiest period is summer (June, July, August) when 40% of the year's total troops are processed. The slowest time period is during the winter months, especially through the holidays.

The schedule for recruit processing at Ft. Leonard Wood as at the other TRADOC CIIPs provides for two separate phases of issues. Phase I issues occur on Day 1 at the Reception Battalion, and can occur on any day. Thursday, Friday and Monday are the heaviest days. Phase 2 issues are scheduled to occur during the 5th week of training but recruits can arrive anytime. Graduation from Recruit Training program occurs at the end of the 8th week. Personnel noted they adjust the Shipping Plan (Recruit Accession Plan) information entered into ACIIPS based on "local knowledge," i.e., years of experience. During the summer months, orders are adjusted in anticipation of the "Summer Surge".

Status at the time of the site visit by the ARN Team on 22 September 1998 was as follows:

➤	Current on hand value	\$4,874,608
➤	Current RO Supply	\$7,173,594
➤	Current Dues-In	\$460,000

These levels were subsequently reduced to minimums as the capitalization/de-capitalization approached, i.e., conversion from TRADOC ownership to DSCP ownership with QLM/Local operation. War reserve (or surge) stock is not held on the post, and was not part of the routine CIIP responsibility; therefore, no information was collected with regards to the metrics for war reserves.

The following table shows that based on an estimated bag cost of \$1,100 and a projection of 22,000 recruits per year, Ft. Leonard Wood was expected to use just over \$2 million worth of inventory on a monthly basis or just over \$24 million annually.

Budgeted Recruits	Estimated Bag Cost	Annual Expense	Estimated Monthly Expense
22,000	\$1,100	\$24,200,000	\$2,016,667

Table 2 – Ft. Leonard Wood Monthly Expense Projections

These figures are confirmed by the information shown in the next table (Table 3). This table provides an analysis of the dollars of inventory issued by the Ft. Leonard Wood Clothing Initial Issue Point during the months since the QLM/Local and VIM/QLM-Central systems were implemented for managing and replenishing inventories located at this CIIP.

As shown, the results indicate that during the months immediately following go-live, there was a significant variation in the budgeted monthly expenditures as compared to the actual monthly issues. This was not unexpected, and it is projected that the figures will converge as additional months of experience become available through on-going operations. This fine-tuning of the system will ultimately provide a year's worth of historical information that will be used for managing supply replenishment. Of course, the actual results achieved will be dependent on the accuracy of the recruit forecasts that are to be used to plan for future inventory requirements.

Ft. Leonard Wood Dollars Issued Analysis by Month								
Activity Month:	Feb-00	Mar-00	Apr-00	May-00	June-00	July-00	Aug-00	Sept-00
Days in Month:	29	31	30	31	30	31	31	30
Dollars Issued:	\$1,425,346	\$1,876,272	\$1,145,280	\$1,674,568	\$2,644,606	\$2,069,704	\$2,703,827	\$2,102,715
Average Daily Usage:	\$49,149	\$60,524	\$38,176	\$54,018	\$88,153	\$66,764	\$87,220	\$70,090
Budgeted Average Daily Usage:	\$69,540	\$65,053	\$67,222	\$65,053	\$67,222	\$65,053	\$65,053	\$67,222
Average Daily Usage Variance:	-41.49%	-7.48%	-76.08%	-20.43%	23.74%	2.56%	25.41%	4.09%

Table 3 – Ft. Leonard Wood Inventory Issue Analysis by Month

As shown in the following graph (Figure 4), the actual number of recruits processed at the CIIP does not closely track the budget for new recruits. This variation resulted in some difficulties in the early days of operation since the inventories had been significantly reduced as part of the capitalization/de-capitalization cutover process.

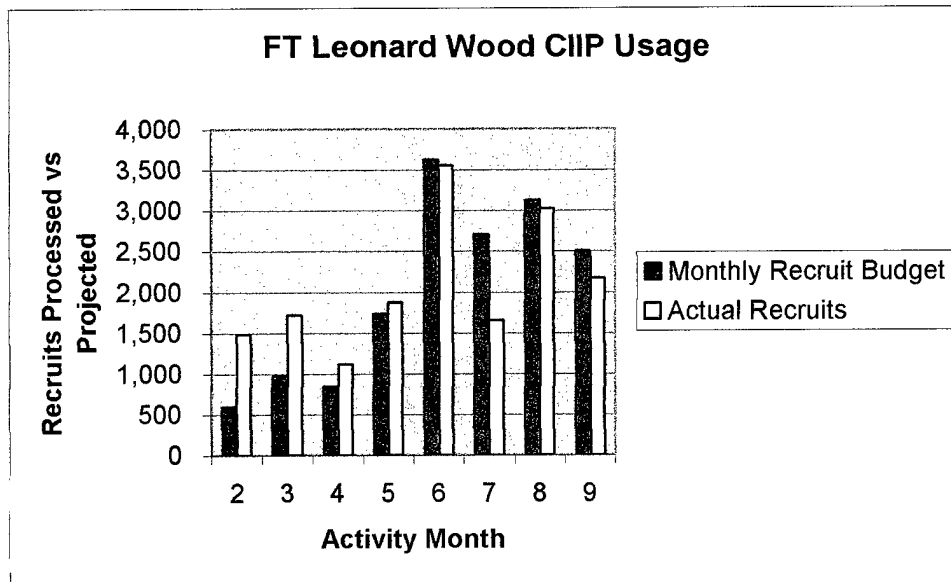


Figure 5 – Ft. Leonard Wood CIIP Usage

The following table (Table 4) shows the fluctuation in the recruit load factor at Ft. Leonard Wood on a month-to-month basis from February to September. This table only shows data from part of the year and indicates the importance of accurate forecasts for the recruit load factor. In the first months of operation, inventory shortages were created due to the extreme reduction of the on-hand inventory values just prior to the capitalization/de-capitalization cutover that occurred when the inventory was converted from TRADOC ownership to wholesale local inventory owned by DSCP.

Period	Total Units Issued	Monthly Recruit Budget	Fiscal Year Recruit Budget	Monthly Recruit Factor	Actual Recruits	Recruit Variance
Feb-00	124,982	595	23,019	0.3102	1,484	149%
Mar-00	153,253	977	23,019	0.5093	1,717	76%
Apr-00	95,319	846	23,019	0.4410	1,114	32%
May-00	144,979	1,734	23,019	0.9039	1,874	8%
Jun-00	258,296	3,624	23,019	1.8892	3,553	-2%
Jul-00	158,753	2,703	23,019	1.4091	1,652	-39%
Aug-00	244,899	3,128	23,019	1.6307	3,029	-3%
Sep-00	187,366	2,501	23,019	1.3038	2,168	-13%
	1,367,847	16,108	23,019		16,591	3%

Table 4 – Ft. Leonard Wood Recruit Load Factor & Recruit Variance

Inventory values vary over time based on the requirements to meet recruit load or processing requirements, i.e., during summer surge periods the inventory levels are maintained at a higher level than during the winter when the number of recruits being processed is lower. In February 2000, as noted earlier in this report, the month-end inventory value was \$4,321,362.05 or about 56 annualized days of supply. Additional information on month-to-month levels after the go-live process may be found on the ARN home page or is available from DSCP, Ft. Leonard Wood, or AdvanTech.

11.0 SUMMARY OF BENEFITS ACHIEVED

This project has provided several benefits and a substantial return-on-investment for DLA and DSCP. The results achieved continue to enhance management of the Recruit Training Centers' wholesale local ("retail local") inventory. Benefits have been provided through the development and implementation of comprehensive decision support tools based on the proven concepts and approaches of the QLM system.

During the implementation process, the need for careful planning and coordination with each site was repeatedly highlighted. Key lessons learned are summarized in the following bullets:

- Site visit planning coordination for each RTC was coordinated with TRADOC and RTC personnel responsible for CIIP operations. This activity was coupled with initial briefings on plans and objectives.
- Work groups were designated to accomplish key activities at each site. This provided the foundation for subsequent implementation support activities.
- Preparations included hardware and software loading before equipment was delivered to a CIIP. This included establishment of the RTC specific database including the ability to incorporate existing issue data and to ensure that there were no outliers in the database for the specific site. This also involved validating the amount of stockage required to properly convert the existing inventory to wholesale inventory without adverse impacts on operational support at the RTC.
- Database information for each CIIP was reviewed on a daily basis for 10-12 weeks prior to the go-live conversion to build a history of stockage parameters required and historical usage. This served to highlight any problems that might otherwise arise during the go-live period by providing for analysis of the local information and issues and set-up preliminary database for site-specific QLM/Local requirements.
- Data management activities were performed on a "rolling basis" to monitor levels before and after go-live at each of the sites and to provide for "parallel monitoring of site specific requirements to ensure continuity of supplies as the site inventories were reduced prior to conversion to single stock-fund and the completion of the go-live activities. The systems were operated for a minimum of one month to ensure that the stockage levels would provide timely replenishment and management data to the DSCP Item Managers.
- User training and implementation support were critical preparation for go-live activities and included on-site orientation and training in QLM/System operation and establishment of the local procedures that were used on a daily basis to maintain support following go-live.

- Document conversion activities were carefully monitored by AdvanTech with support and guidance to RTC CIIP personnel to ensure appropriate conversion of existing open requisitions and related support documents from "RTC ownership" to "depot re-supply" actions with the RTC CIIP ownership transferred to DSCP asset accountability.
- Post implementation support was provided to all sites. This support was critical after the go-live period to ensure that all new procedures were properly implemented and followed on a rigorous basis to ensure accuracy on inventory management and re-supply functions.
- AdvanTech staff provided support in performing, monitoring and adjusting of stockage levels on daily basis for three months following the "go-live" as directed and authorized by DLA program management with optional support available after that time.
- During the implementation process, assistance was provided to DSCP in evaluation of a standard location system to be implemented at all CIIPs.

As summarized above, there were numerous lessons learned from this development project with the installation of QLM/Local at the CIIPs and the refinement of activities with VIM/QLM-Central. As part of the lessons learned, the initial inventory draw down that was conducted by personnel at some of the CIIPS over-shot prudent reductions and caused an initial shortage for a short period of time. Detailed information on the results achieved is provided elsewhere in this report.

VIM is being used today as a common user interface, i.e., application front-end, to access the VIM/QLM-Central decision support capabilities, and the MILSTRIP data mirrored from ACIIPS at the CIIPs to QLM/Central, ASCOT to SAMMS and back to QLM/Local. VIM provides access to QLM/Central databases and functions and to the information and data in the AAVS DataMart for DSCP and CIIPs Item Managers to extract data on all current asset inventories for review. The system also provides for support and management of the related requisitions in SAMMS.

VIM/QLM-Central extracts essential data from the AAVS DataMart and provides both RTC and DSCP Item Managers with the ability to manage inventories in support of end-user requirements. This includes support capabilities based on recruit load factors, the unique "shipping" plans for the CIIP, and other policy directives or locally established performance parameters.

VIM/QLM-Central is providing on-going decision support capabilities for DSCP Item Managers to evaluate stockage levels and replenishment requirements at the CIIPs and at all other related asset inventory locations as desired and directed. These capabilities are providing DSCP Item Managers with the ability to manage the redistribution of assets from DSCP Depots and "Bill & Hold" locations to the appropriate location to support all the RTCs. In addition, the incorporation of Balanced Inventory Flow Replenishment System-Wholesale (BIFRS-W)

concepts into the VIM/QLM-Central capabilities will enable DSCP Item Managers with the essential abilities to balance the flow of goods manufactured by "bill and hold" vendors.

The initial estimates of the benefits of VIM/QLM-Central viewing and managing local and remote assets were based on the business cases previously prepared by both Cal Poly and Clemson Demonstration Projects with objective support provided by the Logistics Management Institute. The projections for the ARMY CIIPs indicated approximately \$30,000,000 of wholesale inventory drawdowns would be achieved from the enhanced management of the RTC Retail inventories (see Cal Poly Business Case and accompanying Logistics Management Institute projections). In addition, an estimated \$2-4,000,000 inventory reduction would occur at each additional Recruit Training Center supported with VIM/QLM-Central and QLM/Local capabilities.

Thus, VIM/QLM-Central and QLM/Local systems provide the Retail and DSCP Item Managers with the essential abilities to affect both the Retail and the Wholesale inventory draw down objectives, and to monitor and report on progress achieved. The initial reduction in inventory at Ft. Leonard Wood *prior* to the capitalization/de-capitalization amounted to \$3.4 million. The following table provides the detailed summary of the inventory levels at each of the Army CIIPS at the time of inventory conversion to wholesale local support with inventory owned by DSCP.

Cap/Decap Summary					
ARMY CIIP		Cap/Decap Date	Dollars Capitalized	Average Daily Usage	Days of Supply on Hand
Fort Leonard Wood		1/25/2000	\$2,932,584.10	\$54,146.00	54.16
Fort Sill		3/24/2000	\$3,272,394.95	\$50,782.00	64.44
Fort Benning		5/25/2000	\$3,461,436.65	\$61,058.00	56.69
Ft. Knox		6/17/2000	\$2,771,111.80	\$38,124.00	72.69
Ft. Jackson			\$7,618,479.00	\$148,047.00	51.46
			\$20,056,006.50	\$352,157.00	56.95

Table 4 – Cap/Decap Summary for Army CIIPS

Ultimately, the results achieved proved the concepts for centralizing the ownership of the inventories at the CIIP locations with replenishment handled as part of an integrated management of wholesale inventories. Thus, this project provided a sound framework for the future expansion of these concepts for future enhanced support of the Recruit Training Centers by the Defense Supply Center Philadelphia.

APPENDICES

Appendix A – Definition of Terms

Appendix B – Site Survey Process & Checklist

Appendix C – Project Personnel

Appendix D – ARN Supply Chain Management Final Technical Reports

Appendix E – RF Technical Report, Ft. Jackson, S.C



Appendix A – Definition of Acronyms

The following acronyms are used in this report and are provided to provide clarity of understanding for the reader.

- ◆ **ACIIPS** – The Department of the Army's Automated Clothing Initial Issue Point System. This was originally developed on a mini-computer and later moved from IBM System 34-36-38 hardware to an IBM AS400.
- ◆ **ACIIPS/R** – The revised Automated Clothing Initial Issue Point System. This system incorporated new hardware and software to minimize potential year 2000 problems (Y2K) and was designed to operate under the Microsoft Windows NT operating system.
- ◆ **ARN** – Apparel Research Network made up of selected industry and academic partners working together to develop innovative solutions for the Apparel industries support of military departments.
- ◆ **ASCOT** – Automated System for Cataloging and Ordering Textiles
- ◆ **ASTRA** - ARN Supply-chain Transaction Repository Audit.
- ◆ **ARN AAVS** – the ARN Asset Visibility System being developed to provide asset visibility across the supply chain (i.e., all locations) to DSCP Item Managers and others.
- ◆ **ASAP** – The Automated Supply Apparel Processing (ASAP) Internet Web based capability for use by manufacturers in reporting status of work in process and quantities of finished goods in their respective inventories.
- ◆ **BDU** – Battle Dress Uniforms, commonly referred to as fatigues.
- ◆ **C&T** – Clothing and Textiles Division of the Defense Supply Center Philadelphia.
- ◆ **CIF** – Central Issue Facility. This facility provides for consolidated storage and issue of items that are issued for exercises and then returned for storage until they are again needed, e.g., tents, flak jackets, canteens, sleeping bags, etc.
- ◆ **CIIP** – The Clothing Initial Issue Point referring to the locations where recruits are inducted into a branch of the military and receive their initial issue of clothing.

- ◆ **CRF** – Clothing Reclamation Facility. Area where items that are either new or used are returned for processing and classified for reissue.
- ◆ **DFAS** – Defense Finance Accounting System - This system interfaces with DSCP for financial activities such as receiving verification. This platform tracks authorizations for vendor payments.
- ◆ **DoD** – Department of Defense.
- ◆ **DODAAC** – Department of Defense Activity Address Code –Used to identify source or destination of electronic financial information as a “cost center.”
- ◆ **DOS** – Day Of Supply.
- ◆ **DSCP – Defense Supply Center Philadelphia** - DSCP controls the procurement and distribution of Medical, Subsistence (i.e., food), and Clothing and Textiles commodities to Defense Logistics Agency (DLA) depots and stock record accounts, worldwide.
- ◆ **DVD** – Direct Vendor Delivery system where a vendor provides supplies ordered directly to the customer rather than first shipping the items to a depot.
- ◆ **EDI** – Electronic Data Interchange standards are used to facilitate computer-to-computer information transfers to achieve timely, accurate transfer of ordering data and related transactions.
- ◆ **EOQ** – Economic Order Quantity
- ◆ **Shipping Plan** – This document details the number of recruits the CIIP plans to train per year and the planned arrival dates at the Clothing Initial Issue Point.
- ◆ **MILSTRIP** – Military Standard Replenishment System
- ◆ **NSN** – National Stock Number
- ◆ **OL** – Operating Level
- ◆ **OST** – Order Ship Time
- ◆ **QDR** – Quality Deficiency Report. These are used to track items that are outside acceptable standards for issue to recruits. These reports provide for communication with DSCP Item Managers regarding problems of quality that are encountered.



- ◆ **QLM** – Quality Logistics Management™ – Material Management inventory system supporting acquisition, issues and distribution and predictive forecasting.
- ◆ **QLM/Central** – The Virtual Item Manager (VIM) system is comprised of several components or modules. The VIM/QLM-Central software module provides the decision support system capabilities for managing wholesale stocks and supply redistributions to end-use customers based on analysis of forecasted and actual usage and inventory availability.
- ◆ **QLM/Central “Lite”** – This was an interim solution during the prototyping and development of the QLM/Central and VIM capabilities. Initially, the data transferred from the ACIIPS at FLW was maintained in a “stockroom” of the QLM/Central “Lite” application. This was specifically set up to permit AdvanTech and designated Item Managers to manage the DSCP-owned stock at FLW until the function was transferred to VIM/QLM-Central with issue data accounted for through SAMMS.
- ◆ **QLM/Local** – The QLM software implemented as a “wholesale local” inventory management system supporting acquisition, distribution and predictive forecasting at Ft. Leonard Wood as a prototype for future sites. The system provides a “local” capability to manage wholesale inventory assets located at the CIIP including receipt and inventory adjustment processing.
- ◆ **QLM/Retail** – The QLM software with enhancements implemented as a retail inventory management system supporting acquisition, issues and distribution and predictive forecasting at Marine Corp Recruit Depot-San Diego with interfaces to ASCOT and the Marine Uniform Materials Management System (MUMMS).
- ◆ **RIC** – Routing Identifier Code – Refers to a code used in SAMMS for identification of location where materials are to be shipped.
- ◆ **RO** – Requisition Objective
- ◆ **ROF** – Reorder Frequency
- ◆ **ROQ** – Reorder Quantity
- ◆ **ROP** – Reorder Point
- ◆ **RTC** – Recruit Training Center (includes Army CIIPs) – These are the facilities operated by the different departments of the military where new recruits are inducted for basic training.

- ◆ **SAMMS** – Standard Accounting and Material Management System - This system is used by the Defense Logistics Agency, Defense Procurement Support Center.
- ◆ **SASS** – Support Activities Supply System - This system is interfaced to MUMMS at the base operations level. This is a Marine Corps “mainframe” platform used to support Operational Marine Units (also called the “Fleet Marine Force”. There is no SASS interface with DSSC for clothing management. SASS supports base level programs such as the desks, chairs and other property management commodities.
- ◆ **SL** – Safety Level.
- ◆ **STANFINS** – Standard Financial Management System used by the Army for financial management activities.
- ◆ **SARSS** – Standard Army Retail Supply System.
- ◆ **STARFIARS-MOD** – Standard Financial Inventory Accounts and Reporting System – Modified planned as the replacement for STANFINS.
- ◆ **VIM** – The Virtual Item Manager (VIM) system incorporates operational data extracted from the SAMMS Clothing & Textile (C&T) server as the basis for the operational and decision support capabilities provided in a single source of information for Item Managers at the retail (Recruit Training Centers) and wholesale (DSCP) level.
- ◆ **VPV** – Virtual Prime Vendor



Appendix B – Site Survey Process & Checklist

The following guidelines and checklist were developed for use in completing the site survey process as part of the implementation activities for QLM/Local at subsequent ARMY CIIPs.

AGENDA

SITE SURVEY

PROCESS & CHECKLIST

- 1. Introductions and Objectives**
- 2. Initial Briefing, Discussion & Information Gathering**
- 3. Tour Facility & Gather Information**
- 4. Exit Briefing/Discussion**



CIIP SITE SURVEY DISCUSSION POINTS AND CHECKLIST

1. General Information:

- a. **Accession Data** – Provide information on the projected number of recruits to be processed by the CIIP during the current fiscal year and previous fiscal year. Are there any significant fluctuations in monthly volumes of recruits processed? How big is the fluctuation? Are there any significant changes expected in the near future, e.g., additional recruit battalion to be added, etc.?
- b. **Inventory dollars** – Discuss the current inventory operating levels and the expected level after go-live conversion (cap/decap).
- c. **Number & Types of Employees to be Trained** – Review the current operational staffing levels and discuss briefly the numbers and types of employees to be trained, e.g., System Administrator, Receipt Processing, Data Entry, etc. List by name and position title/function.
- d. **DSCP Prime Vendor & DVD Contractor Support** – Discuss the support of the CIIP by the DSCP Prime Vendor (if applicable), and Direct Vendor Delivery support. In particular, is there a dedicated truck and what is the usual and customary delivery time? Any support problems or concerns that should be considered or addressed?
- e. **Special Measurements** – Discuss the current processing of Special Measurements and note that these are not supported via QLM since QLM handles only items with standard NSNs. Discuss the use of ASCOT for on-line processing of Special Measurement Orders.
- f. **Returns to Wholesale Inventory** – CIIPs are not currently allowed to return stock to the QLM/Local CIIP inventory.
- g. **Primary RTC Point of Contact and System Administrator** – Discuss the functions of the System Administrator briefly and identify the local primary and alternate System Administrator.
- h. **RTC Implementation Work Group** – Identify the individuals that will be key to the implementation process. (Consider the DOIM personnel for telecommunications issues, facilities personnel if appropriate, etc.)

2. Logistic Data

- a. **NSNs Stocked** – Discuss system parameters for average daily usage by NSN
- b. **Budget Performance** – Briefly review average monthly dollar flow
- c. **Stock Master with weekly updates** (pricing) at T-4 weeks (issues, stock status)
- d. **Primary Source of Supply** – Which depots & manufacturers are supplying the CIIP?
- e. **Order Ship Time** – Discuss any issues or concerns with Order Ship Time.
- f. **Locator System** – Build Bin and bulk locations as early as possible.
- g. **Temporary Holding Areas for Stock Segregation** – Discuss need for and location of separate hold areas for DSCP inventory versus CIIP inventory during the 2 week switch over

3. Facility Description

- a. **Storage Space** – Review CIIP operation space and storage of inventory.
- b. **Operational Concept and Procedures** – Review current operations and inventory flow and processing.
- c. **ACHIIPS Location** – Determine specific shipping location for hardware delivery.

4. Site Preparation

- a. **Hardware** – PC Server with product code scanner (T-5)
- b. **Power** – Availability of power
- c. **Commercial telephone line for FTP**, pcAnywhere, Internet – to avoid the local firewall
- d. **Commercial telephone contact**
- e. **Point of Contact Information** – Building number, room number and point of contact for phone drop

- f. **Internet** to and from DataMart and SAMMS and QLM/Central "Lite"
- g. **Local ISP** name, address, and telephone number

5. Installation & Operation

- a. User Manual and Training
- b. Primary work will be with two screens
 - (1) Inventory Adjustments Screen
 - (2) Entry of DSCP Receipts (scan 1348-1 into system)
- c. System Administrator
 - (1) Security and user access
 - (2) Reports
 - (3) ATI Web site = current orders and status



Appendix C – Project Personnel

The following personnel were involved in various phases or tasks for this project. Each of these individuals played key roles and worked closely together in achieving the desired results from the new systems developed and implemented in support of Ft. Leonard Wood operational needs.

Charles Ballinger – TRADOC Logistics Systems Specialist

Robert E. Bona – AdvanTech Deputy Project Manager, Operations & Programming Support

Dennis Brekhus – Electronic Data Interchange, Inc. (EDII) Project Manager

Denise Carley – ARN Principal Investigator for Electronic Data Interchange, Inc. (EDII)

Gary Colello – Item Manager & Supervisor, DSCP

Sally DiDonato – Clothing & Textiles Branch Manager DSCP

Jean Gipe – ARN Partner for Cal Poly Demonstration Project

Gordon Heathcock – TRADOC ACIIPS Program Support

Dawn Hustis – TRADOC ACIIPS & ACIIPS/R Program Manager

William Kernodle – ARN Partner for Clemson Apparel Research

John McAndrews – Item Manager & Supervisor, DSCP

Kathleen Moore – Assistant to ARN Project Manager

Richard A. Perrin – AdvanTech Project Manager

Janet Stevens – Supervisor & Assistant to Clothing Branch Manager, Fr. Leonard Wood CIIP

Julie Tsao – ARN Project Manager, DLA

Kitty Tully – TRADOC Logistics Program Management & Support

Leroy Ward – AdvanTech Implementation & Training Support

Denver Williams – Clothing Branch Manager, Ft. Leonard Wood CIIP



Appendix D - ARN Supply Chain Management Final Technical Reports

The following reports provide additional material related to other ARN Projects and Supply Chain Management initiatives.

Title	Organization	Date	DTIC Accession Number
Virtual Prime Vendor T1P1 Short Term Project - QLM/Retail at MCRD - San Diego (Includes FLW Assessment)	California State Polytechnic University Pomona Apparel Technology and Research Center	10/99	ADA373865
ARN Program P.D.I.T. Final Technical Report (AAVS, ASAP)	Product Data Integration Technologies, Inc.	4/00	ADA378606
Year 1-3 Demonstration Manufacturing (BIFRS)	Clemson Apparel Research	9/99	ADA369941
ARN Final Technical Report - QLM/Local at Fort Leonard Wood	AdvanTech, Inc. in subcontract to EDI Integration	12/00	ADA373865

These reports are available on the ARN web site at <http://arn.iitri.org>.

Copies of these reports in PDF format are available from the Defense Technical Information Center at: <http://stinet.dtic.mil>.

**Business Process
&
System Interface Assessment**

PROJECT REPORT

**RECRUIT TRAINING CENTER
FORT JACKSON, SOUTH CAROLINA**

May 31, 2002

Access Point (UAP) # 3

Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration Yes	Mounting Height 20 Ft
Material Type <i>Concrete</i>	Mounted To <i>Column/Square</i>	Grid Location B34
AP Housing <i>AP Bracket</i>	Extended DC Power Yes	Channel: 11
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: 175'
Notes: Mount at top of column at front of Dock door at B34, just below the white pipes. Covers 50% Unisex issue unit area.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Concrete</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height 20 Ft	Mounted To <i>Column</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height 23 Ft	Mast Length 1 Ft	Feed Line Cable Length 4 Ft
Notes: 2 antennas mounted on both sides of the AP as far apart as possible on front of column, facing main warehouse, just below the white pipes.		



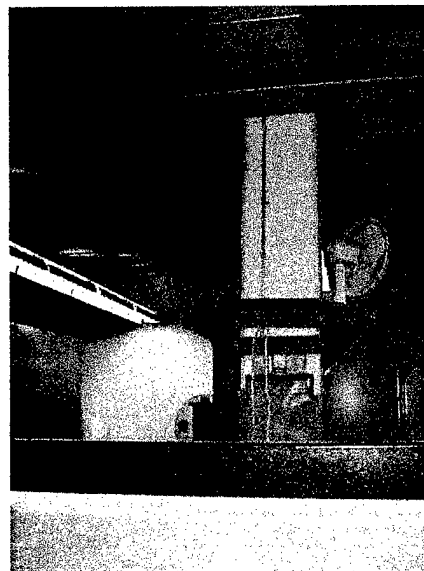
Access Point (UAP) # 4

Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration <i>No</i>	Mounting Height <i>8 Ft</i>
Material Type <i>Concrete</i>	Mounted To <i>Column/Square</i>	Grid Location <i>B22</i>
AP Housing <i>AP Bracket</i>	Extended DC Power <i>Yes</i>	Channel: <i>1</i>
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: <i>280'</i>
Notes: Mount at top of column in room B22, facing section 33. Covers 100% of Female issue unit area, Final fit, and Dressing room.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Concrete</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height <i>8 Ft</i>	Mounted To <i>Column</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height <i>10 Ft</i>	Mast Length <i>1 Ft</i>	Feed Line Cable Length <i>4 Ft</i>
Notes: 2 antennas mounted on both sides of the AP as far apart as possible on front of column, facing section 33.		



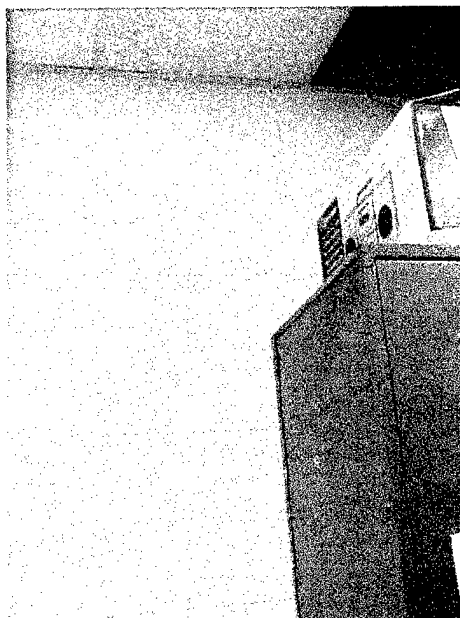
Access Point (UAP) # 5

Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration Yes	Mounting Height 8 Ft
Material Type <i>Drop Ceiling</i>	Mounted To <i>Ceiling Grid</i>	Grid Location B17
AP Housing <i>AP Bracket</i>	Extended DC Power Yes	Channel: 11
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: 170'
Notes: Mount on ceiling grid just opposite the press rooms in the File room. Covers 100% of Alterations, Press, Accounting, File, Final Fit, Dressing rooms, and 50% of hall way.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Drop Ceiling</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height 8 Ft	Mounted To <i>Ceiling Grid</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height 8 Ft	Mast Length 1 Ft	Feed Line Cable Length 4 Ft
Notes: 2 antennas mounted on ceiling grid on both sides of the AP approx. 3' apart		



Access Point (UAP) # 6

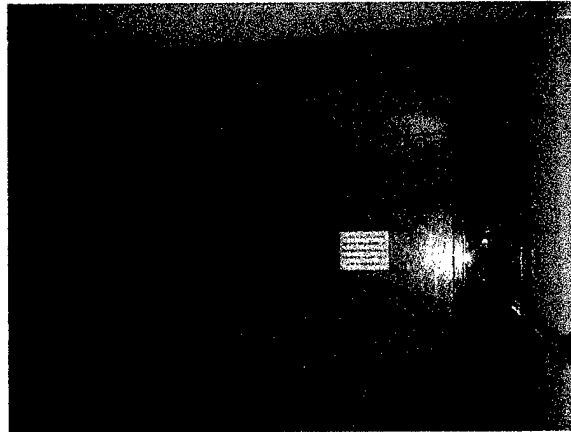
Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration No	Mounting Height 8 Ft
Material Type <i>Drop Ceiling</i>	Mounted To <i>Ceiling Grid</i>	Grid Location B1
AP Housing <i>AP Bracket</i>	Extended DC Power Yes	Channel: 6
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: 125'
Notes: Mount on ceiling grid just opposite the entrance door off of the main hallway. Covers 100% of Insignia, and Showdown. Covers 50% of hallway and Alterations. Covers 10% of Unisex issue unit.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Drop Ceiling</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height 8 Ft	Mounted To <i>Ceiling Grid</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height 8 Ft	Mast Length 1 Ft	Feed Line Cable Length 4 Ft
Notes: 2 antennas on mounted ceiling grid on both sides of the AP approx. 3' apart		

Mount inside this room



Attachment A – Equipment and Materials Required

Supplied by Customer

Unshielded Twisted Pair Category 5

	Description	Part Number	Manufacturer	Qty
1.	Modular Cord or Patch Cable	<i>By customer</i>	<i>By customer</i>	6

10BaseT

	Description	Part Number	Manufacturer	Qty
1.	CAT5 Ethernet Cabling	<i>By customer</i>	<i>By customer</i>	940'
2.	RF45 Connectors	<i>By customer</i>	<i>By customer</i>	12

Miscellaneous Materials (Nema Etc.)

	Description	Part Number	Manufacturer	Qty
1.	8 port Ethernet hub	<i>By customer</i>	<i>By customer</i>	1

Purchase from Computer Pro's ,

Spectrum24™ Antennas

	Description	Qty
1.	Single High Performance Access Point Antenna (3dBi) with 4 foot Plenum cable connection, and mounting hardware	12

DC Power

	Description	Qty
1.	24V Power Supply for extended DC for one Access Point	6
2.	US Power Cord for UAP Power Supply	6
3.	BIAS-T power-over-ethernet	6

Spectrum24™ Universal Access Point

	Description	Qty
1.	Spectrum24 - 2.4 GHz, 100 mW, 11mb Ethernet Access Point, without PSU or Antenna.	6

Mounting Brackets

	Description	Qty
1.	Mounting Bracket plate	6
2.	Drop Ceiling Mounting Bracket plate clips	4

Table of Contents

	<u>Page</u>
1.0 EXECUTIVE SUMMARY	2
2.0 PROJECT OBJECTIVES & SCOPE	3
2.1 PROJECT OBJECTIVE	3
2.2 BUSINESS AREAS ASSESSED	3
2.3 PROJECT SCOPE	3
3.0 ASSESSMENT AREAS	4
3.1 RECEIVING	4
3.1.1 <i>Current Process</i>	4
3.1.2 <i>Issues and Opportunities</i>	6
3.1.3 <i>Applicability to Other RTCs</i>	7
3.1.4 <i>Recommendations</i>	11
3.2 RECRUIT ISSUES	11
3.2.1 <i>Current Processes of Capturing Issue Transaction Data</i>	11
3.2.2 <i>Potential Improvements</i>	12
3.2.3 <i>Applicability to Other RTCs</i>	12
3.2.4 <i>Recommendations</i>	13
3.3 STOCK MOVEMENT	13
3.3.1 <i>Current Processes</i>	13
3.3.2 <i>Issues and Opportunities</i>	14
3.3.3 <i>Applicability to Other RTCs</i>	15
3.3.4 <i>Recommendations</i>	15
4.0 SUMMARY	15
APPENDICES	18
APPENDIX A – DEFINITION OF TERMS	19
APPENDIX B – RADIO FREQUENCY SITE SURVEY	21

1.0 EXECUTIVE SUMMARY

This project was in support of the Apparel Research Network (ARN) effort to evaluate the business practices and systems interfaces to determine and report on the feasibility of process improvement either through system modifications or business practice changes. These efforts focused on improving inventory accuracy, speeding recruit processing, achieving a decrease in zero balance items, and reducing “zeroing-out” recruits. All findings were reported as solutions for Ft. Jackson, and the feasibility of applying these changes to other ARN Recruit Training Centers (RTCs) is examined and discussed.

Ft. Jackson’s inventory receiving, warehousing, and processing practices in particular have been the subject of considerable scrutiny for the past twenty-four months or more. This continuing concern led to the request for AdvanTech, Inc. assistance at the RTC, providing suggestions and guidance for operational improvements to be implemented. The modifications in practice and structure have resulted in positive workflow improvements, increased inventory accuracy, reliable recruit issues, and verifiable statistical reconciliation.

Key findings from this assessment include:

- Opportunities abound at each RTC to capture recruit issues much more efficiently within ACIIPS using the AutoScan issues processing solution;
- Utilization of radio frequency hand held terminals (RF HHT) during the receiving process would eliminate time consuming and error prone batch processes currently in place at each RTC; and,
- Inventory locator systems and stock movement tracking enhance the warehouse operators’ ability to locate, count, and manage warehouse issue stock.

2.0 PROJECT OBJECTIVES & SCOPE

2.1 Project Objective

The objectives of this STP (Short Term Project) were to conduct a business process and systems interface assessment of the Ft. Jackson Clothing Initial Issue Point (CIIP) and identify and recommend process and/or systems improvements. Specifically, this report identified areas where processes can be improved at Ft. Jackson and/or other Recruit Training Centers (RTCs), identified the recommended changes, and identified the potential impact that the changes would have on operations.

It is expected that other Army RTCs with similar operating practices will realize benefits similar to those enjoyed by the Ft. Jackson RTC. Although each RTC operates under a separate management team, process improvements at one RTC which are transferable to other Army RTCs benefit the local RTC as well as the larger system as a whole, and should thus be implemented to the benefit of all.

2.2 Business Areas Assessed

An initial investigation of the Ft. Jackson RTC operations led to the further definition of the objectives of this study. This report focuses on the following operational areas and provides a thorough and in-depth look at the activities associated with these areas, the operational improvements identified for each of these areas, and the impacts of recommendations to each area for applicable RTCs. The areas assessed were:

- Receiving;
- Recruit Issues; and,
- Stock Movement.

2.3 Project Scope

The scope of this portion of the STP was comprised of the following elements and activities:

- Perform a business process and system interface review of the Ft. Jackson RTC, determine the issues that are adversely affecting the DSCP asset management and smooth operations at the RTC, recommend solutions and report the findings.
- Create a feasibility study that discusses the opportunity of applying recommended process improvements and systems changes to other Army RTCs and MCRDs.

The remainder of this report provides the detailed assessment of business areas that can be improved at Ft. Jackson. Included in this detailed report are the facts and data available to AdvanTech, which led to the recommendations and conclusions found at the end of this report.

3.0 ASSESSMENT AREAS

The initial investigation of Ft Jackson RTC operations identified eight business areas that will benefit from either systems interface modifications, business process improvements, or system enhancements. Applicability for the other RTC sites is discussed and summarized within each study area, and finally AdvanTech recommendations are made for each business area.

3.1 Receiving

3.1.1 Current Process

Receipts are processed five days per week at Ft. Jackson. Approximately 200 receipts are processed weekly or an estimated 10,400 documents annually. During this past January thru March preceding the summer surge, receipts approximate summer surge volumes due to a DSCP policy of shipping female items as they were issued, in "each" quantities, thus causing an artificially high number of shipping documents per volume of items issued to recruits.

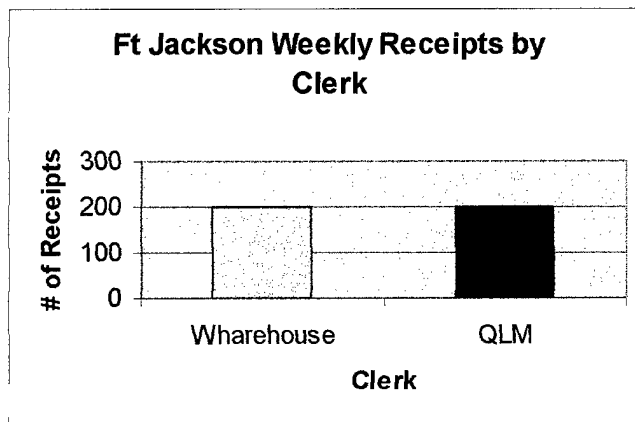


Figure 1, Duplicate Receipt Processing

- The warehouse clerk validates the receipt by checking the paperwork against the items physically received.
- The QLM/L clerk takes the annotated paperwork from the warehouse clerk and scans receipts or manually enters the receipt data into QLM/L.

Receipts arrive at the loading dock of the main warehouse and are processed by two receiving clerks. The receiving clerks inspect the items and compare the physical items to the receiving documents verifying that the National Stock Number (NSN) and quantity match. The receiving documents are annotated with the quantity received, the date, and one of the receiving clerk's initials. Supply items are then delivered to the issue line for

distribution to recruits, stored in the appropriate on-site warehouse location, or delivered to an off-site warehouse for storage.

The receiving documents are typically given to the QLM/L clerk three or four times per day. The QLM/Local clerk processes the receipts into the QLM/L system. The QLM/L clerk manually maintains a "tally sheet" that keeps track of the manifested items received on a specific truck from Lion Vallen. (Note: Not all items are received from Lion Vallen. A separate record is also kept of receipts from other sources.) The QLM/L clerk also prints two QLM/L reports and physically compares receipt documents to the inventory adjustment report and receiving report. This manual comparison is used to validate that the correct quantity was entered into QLM/L. This means that at least two different people (receiving clerk and QLM/L clerk) perform duplicate processing of approximately 40 receipts each day.

One problem exists associated to the receipt data processed versus the issue data processed into QLM/Local. The problem is that if an issue is made before the receipt is picked-up in QLM/Local an inventory imbalance will occur. This is due to a timing constraint. Issues are being made to recruits throughout the day, newly received stock is being placed on the issue line throughout the day, QLM/Local inventories are updated overnight via the File Transfer Protocol (FTP) process to the VIM/QLM-Central information. The logic in QLM/Local is: "The system shall record an issue equal to or less than the inventory quantity. Any issues made in excess of the inventory quantity are ignored."

For example: Assume that item "A" has a beginning balance of 50, and an additional 100 are received and placed on the issue line. Further assume that 125 recruits are issued item "A". If the receipt data for item "A" is recorded and the issue data is captured, there should be a beginning balance of 25 the following day. If, however, the receipt data is processed the next day and not the day that the issues are made, then an incorrect beginning balance of 0 is reflected the following day. Once the receipt is processed the system calculates a balance of 100 (instead of the correct balance of 25) for the ending balance for the next business day. The receipt data and issue data is compared and added and/or subtracted during the QLM/L scheduled tasks every evening. If the receipt data is captured, transmitted, and updated in QLM/L before the stock is moved to the issue line, this incorrect inventory situation will not occur.

Item	Beginning Balance Day 1	Qty Physically Received	Qty Moved to Issue Line	Qty Issued	Receipt Qty Entered into QLM
"A"	50	100	100	125	0

The end-of-day process runs on QLM/Local, and the receipt files and adjustment files are transmitted to ASTRA. The ACIP file is also sent to ASTRA.

Item	QLM Automatic Inv Adjustment Gain	Beginning Balance Day 2	Receipt Qty Entered	Ending Balance	Correct Balance
A	75	0	100	100	25

The next morning QLM/L automatically performs an inventory adjustment gain in order to prevent a negative balance (125 day one issues from a day one beginning balance of 50). This means that the beginning balance on day two is zero instead of -75. Once the receipt is finally entered into QLM/L, the balance reflects 100 instead of 25. The RTC must remember to check for these "Inventory Too Low" adjustments and then process an inventory adjustment loss in order to reflect the correct balance.

3.1.2 Issues and Opportunities

There are four potential solutions that can be used to enhance the receiving operation at Ft. Jackson:

First, a change in business practices may be instituted system wide requiring that all receipts be processed into QLM/L before the close of business and before the QLM/L "end of day" task runs. This change is an effective low cost solution, but it is only as reliable as the staff's dedication to completing the daily tasks prior to departure each day. There is a potential during the high summer surge and winter exodus volume that receipts may not always be processed prior to the QLM/L end-of-day processing. This change still requires two people to "process" every receipt with the associated personnel costs.

- 10,400 receipts/year
- QLM/L clerk averages 4 minutes per receipt
- Warehouse clerk averages 3 minutes per receipt
- Estimated QLM/L clerk rate GS4.
- Estimated Warehouse clerk rate GS2.

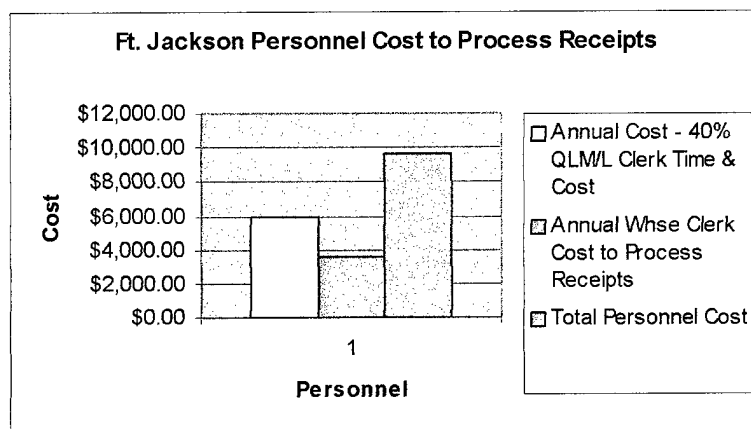
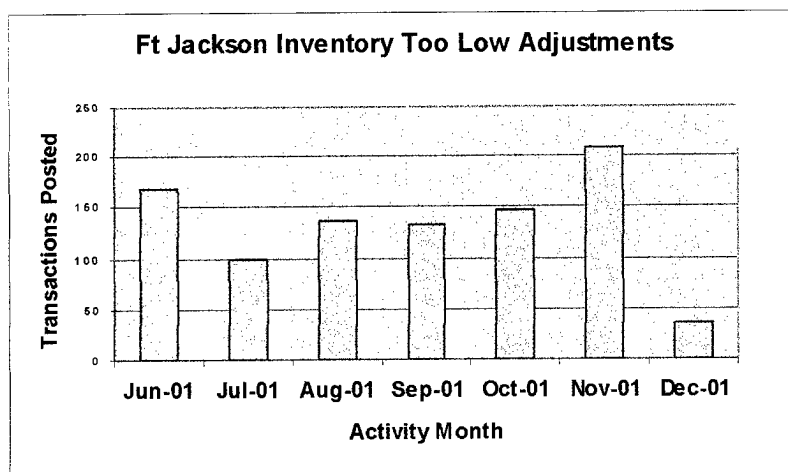


Figure 2, Ft. Jackson Personnel Costs for Receipt Processing

Second, the logic in QLM/L could be changed to allow a negative inventory balance to accommodate issues made in excess of the current recorded on-hand balance. The difficulty with this approach is in attempting to determine when a negative quantity has resulted from annotating the wrong quantity in the "aciipssue" file vs. when a negative quantity is the result of a legitimate issue to recruits on newly (unrecorded) receipts. This change, as with the first suggestion mentioned above, still requires two people to "process" every receipt.



- Ft Jackson averaged 132 Inventory Too Low transactions per month.

Figure 3, Inventory Too Low Adjustments

Third, automate the receiving process at the warehouse/receiving clerk area, making receiving a real-time process as opposed to the current batch process. This accomplishes two things.

- First, the stock balance would update immediately. The problem of stock moving to the issue line without being recorded in QLM/L would be eliminated.
- Second, it eliminates an estimated 70% of time used by a QLM/L clerk assuming that 30% of the time there will be a discrepancy that requires research and/or intervention by the QLM/L clerk.

With this solution, the receiving clerk would update QLM/L immediately after having verified the NSN. Changing from a batch process to a real time process requires the use of handheld terminals (HHT) utilizing data transfer of either cellular packet data protocol (CPDP) or radio frequency (RF) technologies.

Fourth, create new reports within QLM/Local that will eliminate the necessity of manually maintaining control logs for the receiving process. A "Manifest Discrepancy" report should be created using an electronic copy of the Regional Distribution Center's (RDC) manifest. If an item on the manifest does not have a corresponding receipt posted, the discrepant line item/document number is added to the report. At Ft. Jackson the RDC is Lion Vallen. This report is valid only if the percentage of dollars through the RDC is increased to at or near 90%. A "Receiving Activity" report should be created that lists in document number sequence each open document number, the original quantity due in, and each Julian Date and quantity received until the document has been completed. And lastly, the QLM/L clerk must have the capability of accessing archived receipt data.

3.1.3 Applicability to Other RTCs

Although this study was conducted onsite at Ft. Jackson the solutions outlined above are applicable to other RTCs. By looking at the volume of transactions and the procedures used we can determine the benefits of implementing selected solutions and process

improvements. A RF survey should be conducted to determine if a low cost RF implementation could be accomplished for each site.

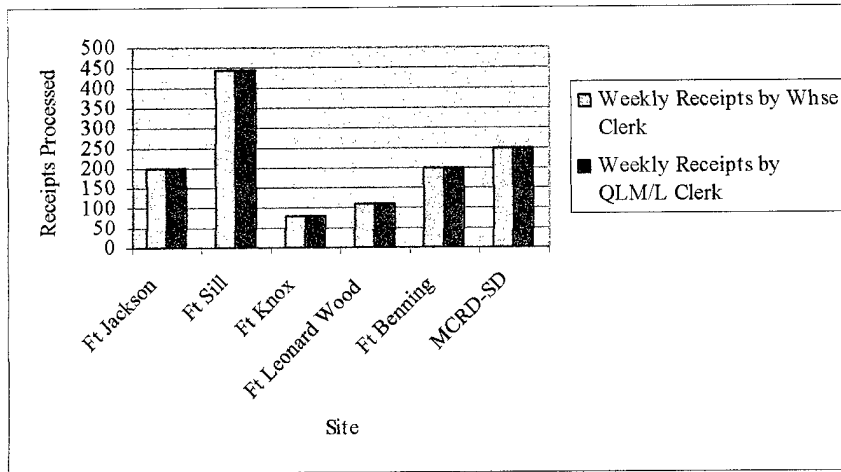


Figure 4, RTC Receipt Processing Manpower

- Two different people at each site process each receipt.
- Process efficiencies can be gained through the use of HHTs at the receiving area.

Each RTC can reduce the number of "Negative Balance" adjustments by ensuring that all receipts are entered into QLM/L before the end-of-day process occurs.

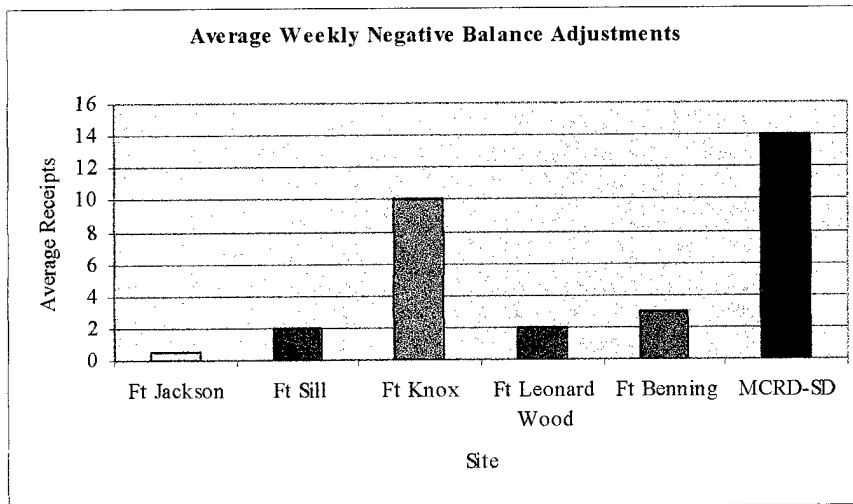


Figure 5, RTC Weekly "Inventory Too Low" Adjustments

- Each RTC can eliminate the Negative Balance Adjustments.
- And each RTC can eliminate the resulting inventory adjustment loss transaction requirement.
- Numbers quoted are based on site interviews. Ft Jackson said they averaged 1 per week but actually averaged 40/week.

➤ **Ft. Sill**

Ft Sill averages approximately 450 receipts per week and could therefore benefit greatly from a more efficient receipt processing business model.

The RTC function at Ft. Sill is comprised of three different processing areas: the bulk warehouse/receiving building, the recruit issue facility, and the management/QLM/L office. Each of these three areas are located approximately 1.5 miles from each other. This distance may make the RF solution impractical. A technical RF survey would be

required in order to determine the actual cost of providing transmission capability over that distance. Although RF technology could be utilized to enter receipts, provision would have to be made to provide alternate connectivity between the warehouse/receiving area and the QLM/L workstation, either through Wireless IP or a download via a phone line.

Receipt documentation (1348's and miscellaneous shipping documents) are delivered to the QLM/L clerk two to three times per day, however there are, on average, two Negative Balance adjustments each week. The focus by the warehouse clerk is to support the issue line and often the receipt paperwork is not provided to the QLM/L clerk before close of business.

Note: A change to the contractor's duties may be required. Ft. Sill utilizes contractors for the RTC operations, and a change in business practices or technology sometimes necessitates a change to the contractor's existing Statement of Work (SOW).

➤ **Ft. Leonard Wood**

Ft. Leonard Wood processes approximately 110 receipts per week and averages approximately two "Negative Balance" adjustments weekly.

The RTC function at Ft. Leonard Wood is also comprised of several processing areas: three bulk warehouses, a bulk warehouse/receiving/ACIIPS office/Phase I building, and a Phase II/management office/QLM/L building. In similar fashion to Ft. Sill, the receiving function is located approximately one mile from the QLM/L office, necessitating an alternate connectivity answer such as Wireless IP (if available) or download via a phone line.

Ft Leonard Wood can take advantage of technology improvements in the receiving process and would benefit from the additional reports.

➤ **Ft. Benning**

Ft. Benning processes an average of 200 receipts per week.

Ft. Benning is similar in design to the Ft. Jackson RTC, with supplemental off-site warehousing for surge volumes. All inventory receipts, ACIIPS activities, and QLM/L clerical activities are performed at the main RTC building. The Ft. Benning physical layout, like Ft. Jackson, provides an optimal environment in which to utilize the recommended RF technology.

Due to the proximity of the receiving dock to the QLM/L workstation, receiving paperwork is provided to the QLM/L clerk multiple times per day, with data entry

completed during the daily work cycle. Despite this proximity, there is an average of 3 "Negative Balance" adjustments each week.

Ft. Benning should obtain similar efficiency enhancements and cost savings as those experienced at Ft. Jackson.

➤ **Ft. Knox**

Approximately eighty receipts are processed on a weekly basis at Ft. Knox.

The RTC function at Ft. Knox is a hybrid of the other Army RTCs. Receiving is performed at two adjacent buildings, located a few hundred feet from each other, and ACIIPS and QLM/L clerical activities are performed within the same office. The issue lines are located within the building housing the offices. RF technology could be employed, however a thorough RF survey should be conducted in order to ensure that RF connectivity from two buildings to the QLM/L system building is economically feasible.

Despite the low number of receipts processed each week, Ft. Knox has one of the higher "Negative Balance" adjustment rates of all Army RTCs. Ft. Knox averages ten per week. The improved efficiency and labor savings will benefit Ft. Knox, and the added reports will provide an easier tracking and audit tool for the receiving process.

Note: A change to the contractor's duties may be required. Ft. Knox utilizes contractors for the RTC operations, and a change in business practices or technology sometimes necessitates a change to the SOW.

➤ **MCRD-SD**

MCRD-SD processes approximately 250 receipts per week and averages approximately 14 "Negative Balance" adjustments weekly.

MCRD-SD RTC operations are conducted in several processing areas. Primary to this project is the receipt processing area, the QLM/L system area. These two areas are located in separate buildings and are located approximately 200 yards apart. RF technology could be employed, however a thorough RF survey should be conducted in order to ensure RF connectivity from the receiving area to the QLM/L system building is economically feasible or to determine if an alternate connectivity answer such as Wireless IP (if available) or download via a phone line is necessary.

MCRD-SD should implement immediately the business practice of entering all receipt data into QLM/L before the close-of-business (COB) process begins. MCRD-SD can also take advantage of technology improvements in the receiving process and would benefit from the additional reports.

3.1.4 Recommendations

Where possible, it is recommended that RF handheld receiving automation be implemented as the most complete and reliable solution to the receiving process enhancement concerns. At sites where RF technology is not feasible, AdvanTech recommends that an alternate transmission method be provided with the same HHT model and application programs. It is further recommended that all RTCs strive to process all receipts prior to the end-of-day scheduled tasks. And lastly, in order to eliminate manually tracking and annotation of documents, it is recommended that the reports previously mentioned be incorporated into the Reports module of QLM/L.

3.2 Recruit Issues

Opportunities exist to improve both the efficiency and accuracy of the capture and processing of recruit issue transactions. Through the use of optical imaging technology an automated interface can be developed and implemented which will reduce the manual data entry of issue data into the Army ACIIPS system and will reduce the potential keystroke errors.

3.2.1 Current Processes of Capturing Issue Transaction Data

Each recruit carries a pre-printed form through the issue line as he/she is measured and issued bag items. As items are issued to the recruit, a CIIP employee annotates the form with the quantity and size issued. When all issues have been made, the recruit performs a verification inventory and signs the issue form. These forms are collected and provided to the ACIIPS staff. Each recruit issue is keyed into the ACIIPS system by hand. Currently there are five individuals responsible for keying these issues into ACIIPS on a daily basis, and a manager responsible for ensuring that the function operates as expected.

***Note:** Ft. Jackson and the other four Army RTCs use both QLM/Local and ACIIPS to record transactions that affect their inventory balances. ACIIPS is the system used to capture all recruit issues. This data is sent through another ARN system (ASTRA) each evening, and is then reformatted and sent back to QLM/Local to reduce the inventory balances the next morning.*

Ft. Jackson averages 5,085 Phase I recruits and 4,555 Phase II recruits during the summer surge (June – September) alone. This means that Ft. Jackson ACIIPS staff enters approximately 96.4 recruit issues per person per day during the peak summer surge activity. Although recruit issue forms are collected and given to the ACIIPS staff periodically throughout the day, the last batch of recruit forms is typically provided to the staff in the late afternoon. This can then require overtime in order for the staff to enter this data into the ACIIPS system and then send the issue data to the ARN systems.

# Recruits During Summer Surge	# Recruits per Month During Summer Surge	# Recruits per Day During Summer Surge	# Recruits Processed into ACIIPS per Day by 5 ACIIPS Staff	Average Recruits Processed per ACIIPS Staff per Day
9640	2410	482	482	96

3.2.2 Potential Improvements

Eliminating the manual keying of issue transactions can increase the speed and accuracy of the issue data capture at Ft. Jackson. A similar process was implemented at the Marine Corps Recruit Depot – San Diego (MCRD-SD). This new optical imaging application provides the mechanism for one person at MCRD-SD to process up to 150 recruits' issues per hour into the MCRD-SD legacy system. Each recruit averages 2 forms for Phase I and 2 forms for Phase II for an average of 75 Phase I recruits and 75 Phase II recruits per hour. At Ft. Jackson this means that 1 person could potentially process 600 Phase I recruits or 600 Phase II recruits in an 8 hour day.

Phase I Recruits During Summer Surge	# Recruits per Month During Summer Surge	# Recruits per Day During Summer Surge	# Recruits Processed into ACIIPS per Day by 1 Person	Phase I Forms Scanned for 255 Recruits	Potential Forms Scanned by 1 Person (150/hr)
5085	1271	254	254	508	1200

Phase II Recruits During Summer Surge	# Recruits per Month During Summer Surge	# Recruits per Day During Summer Surge	# Recruits Processed into ACIIPS per Day by 1 Person	Phase II Forms Scanned for 227 Recruits	Potential Forms Scanned by 1 Person (150/hr)
4555	1138	227	227	454	1200

The implementation of an optical imaging solution to the issue transaction capture process integrated with the existing ACIIPS legacy system will require some level of development, additional software and additional hardware. The development effort would include the design of the new scan capable issue forms, the development of the interface requirements/design specifications to the ACIIPS system, and the development of the scan form database and processes. This will include close coordination with TRADOC to ensure that the design and subsequent development of the file format used to interface with the ACIIPS system meets TRADOC requirements.

The procedure of annotating issue forms would not change but at the end of an issue the forms would be scanned as opposed to being keyed-in by hand. The result would be that Ft. Jackson could use two people to record recruit issues into ACIIPS instead of the five currently required. In addition, the accuracy of the data captured should be improved through elimination of data entry keying errors.

3.2.3 Applicability to Other RTCs

Each of the other Army RTCs could benefit in similar fashion to the opportunities outlined for Ft. Jackson. Forms requirements are similar among the Army RTCs and Army forms should be able to be shared among the Army RTCs. This in turn will reduce development and maintenance costs associated with forms modifications due to bag changes.

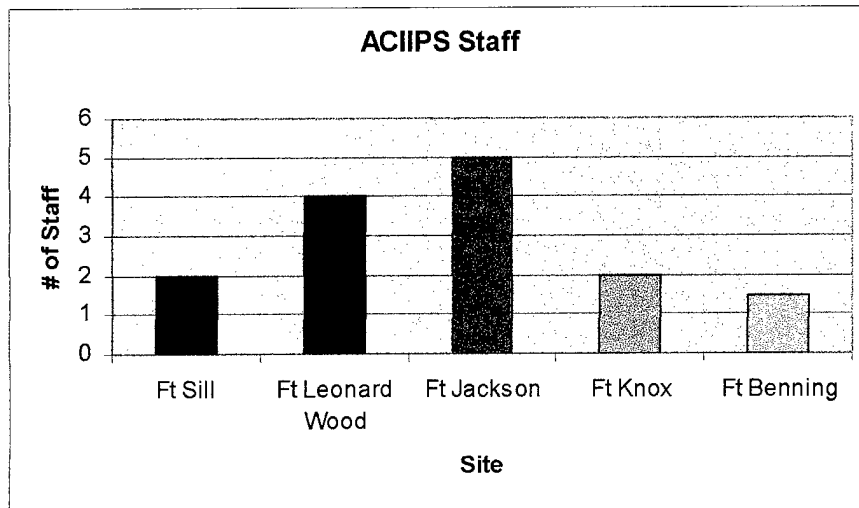


Figure 6, Army CIIP Staff

- The Ft. Jackson RTC employs an additional person as a manager for the data entry staff, not indicated on the graph.

3.2.4 Recommendations

It is recommended that the optical imaging solution for issues processing be installed at Ft. Jackson. In addition an implementation template should be created for use during the deployment of the optical imaging technology to other RTCs.

An actual assessment of the benefits obtained by the optical imaging technology at Ft. Jackson should be documented and used to determine the viability and return-on-investment of the technology for future implementation at the other Army RTCs.

3.3 Stock Movement

Potential enhancements exist to improve the re-supply of the issue line from the bulk inventory warehouses. A methodical and controlled approach could be employed whereby RTC employees are able to request re-supply of issue lines from bulk and/or QLM/Local could generate a restocking pick list everyday to re-supply the issue lines.

3.3.1 Current Processes

Currently the issue line re-supply is a random process.

The issue line uses gravity feed racks. As a box/case is opened, emptied, and removed from the front of the rack a space is created at the back of the rack. Warehouseman continually push cases/boxes of supply items into these empty spaces on the racks. This is an acceptable practice during slow issue periods but is not the most efficient use of resources during the peak summer surge season. Often during summer surge supplies move so quickly that the warehouseman must find stock in outlying warehouses, load these supplies on a truck, drive the supplies to the issue warehouse where they are off-loaded and then pushed to the issue line. To gain some efficiency the warehouseman can pull more stock than is needed in order to reduce the number of trips required or he/she may need to make several trips throughout the day.

The QLM/Local system has been configured as one "stock room" with both bin and bulk locations for each individual National Stock Numbers (NSNs). With this configuration there is no way to determine the usage level from the issue line and therefore the recommended stockage level, there is no way to determine how much stock is held in any given location, and there is no way to tell if there is any stock in a location. Users can tell that they have several locations but not whether stock exists in that location. Re-supply of issue lines can be very time consuming because the warehouseman may check several locations before he/she finds a location with stock or finds enough stock from several locations to fill the need on the issue line.

3.3.2 Issues and Opportunities

There are viable solutions that could be implemented to help alleviate this inefficient re-supply process. **First**, the QLM/Local system could be reconfigured to incorporate separate "stock rooms" for the issue lines and each bulk warehouse. This would do two things. Users would now be able to see how much stock was in each stockroom, or in this case, in each location. And stockage levels could be established for each location. By creating these different "stockrooms" and corresponding stockage levels, QLM/Local can track the usage from each stockroom and generate a pick list from bulk "stockrooms" to re-supply the issue line. This pick list could be run as a part of end-of-day tasks and be available to warehouseman each morning. The warehouseman could then save time by going directly to the location(s) on the pick list and re-supplying the applicable issue locations.

A **second** solution would be to enhance the above scenario by incorporating a stock movement RF application. This would allow the system to continuously send real-time "pick list" re-supply data to the RF handheld terminals vs. a batch process. If an issue line becomes critically short during the day, the warehouseman is notified via the handheld terminal that an item is critically short. He/she could use the handheld terminal to query the QLM/Local system for stock locations and quantities on hand, and when the stock is moved the NSN would be scanned, the quantity would be entered and the issue location entered. The bulk location(s) would be decremented and the issue locations would be increased accordingly. This periodic re-supply would be rolled-up into the end-of-day calculations during the development of the batch pick list.

This does two things, it provides a mechanism to plan workload and resources each morning for re-supply actions, and it also provides the flexibility to react to re-supply needs throughout the day in a real-time process. The first solution requires that the RTC place location and NSN barcodes on each location, requires that the stockrooms be established in QLM/Local, and requires programming of a new pick list function, and requires modification to the end-of-day processes. The second solution requires the programming of an additional handheld terminal application for stock movement, modification to QLM/Local to create a re-supply request as needed, and modification to the current QLM/Local file transmission to enable directing specific files be sent to specific handheld terminals.

3.3.3 Applicability to Other RTCs

All RTCs are setup in the same manner with one stockroom, all have a need to re-supply the internal issue lines, and all have multiple stockage locations for each NSN. Each RTC can potentially gain the same efficiencies that can be realized at Ft. Jackson from both the programmed batch pick list functionality as well as the real-time RF application which would allow for re-supply throughout the day without adversely affecting the end-of-day pick list calculations.

3.3.4 Recommendations

AdvanTech recommends that both solutions be implemented at Ft. Jackson and an implementation template be developed to enhance the efficiency of deployment to the remaining RTCs. This will increase inventory accuracy but tracking the movement and subsequent increases and decreases to stockage quantities in each location.

4.0 Summary

The RF network and applications were installed at Ft. Jackson during January 2002. Final training was conducted on 22 January 2002. The site has been using the application for all receiving functions since implementation. The results of the implementation of the RF receiving application have been numerous. Users have found the system easy to use and beneficial in their daily processing activities.

- The “Inventory Too Low” adjustments have dropped from an average of 132 per month down to 12 per month.

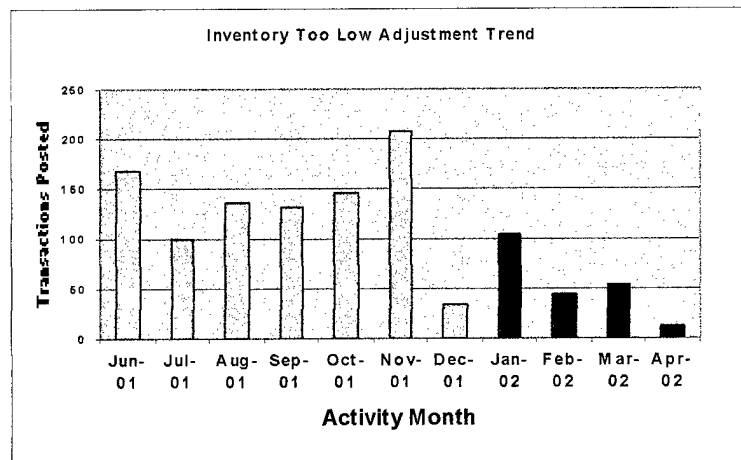


Figure 7, Adjustment Trend

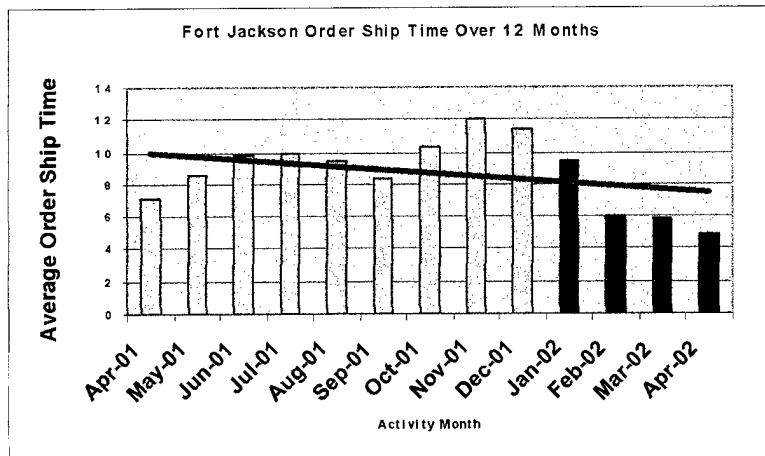


Figure 8, Order Ship Time Trend

- There has been a reduction in the order ship time by 4.5 days.

- And lastly, there has been a decrease in the duplication of effort during receipt processing by 93%. Now the receiving clerk(s) are able to process 93% of the receipts directly from the receiving floor with only 7% of receipts requiring some sort of intervention by the QLM/Local clerk.

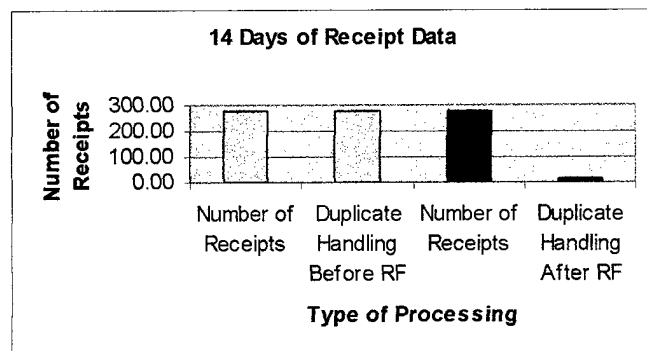


Figure 9, Duplicate Effort Trend

Can all Recruit Training Centers experience similar results from the RF receiving application solution? All should experience a similar reduction in redundant manpower usage; all should experience a decrease in Order Ship Time; and all should see a reduction in the "Inventory Too Low" adjustments.

APPENDICES

Appendix A – Definition of Terms

Definition of Terms

ACIIPS – Army Clothing Initial Issue Point System This is the system that Army RTCs use to capture and transmit issue data.

ARN – Apparel Research Network

AutoData Scan Forms – Optical imaging technology software and subsequent issue forms created for DLA

CIIP – Clothing Initial Issue Points (Army)

COB – Close of Business

HHT – Handheld Terminals

Inventory Too Low – Adjustment in QLM/Local that automatically increases inventory if an issue exceeds the recorded quantity on hand.

QLM/Local – Quality Logistics Management/Local: This is the system used by Army and Marine Corps RTCs to manage the DLA inventory.

RF – Radio Frequency

RTC – Recruit Training Center

VIM-QLM/Central – Virtual Item Manager-Quality Logistics Management/Central: This is the wholesale level system created for DSCP to manage the inventory at the Wholesale Local (RTC) sites.

Appendix B – Radio Frequency Site Survey

Note – AdvanTech contracted with Computer Pro to complete a site survey to identify the required number of wireless antennae and the best location for placement of these devices to ensure good connectivity for the system once it was installed. This support provided significant benefits to the subsequent success of the project since good connectivity from the wireless hand held data collection devices to the ARN LAN and QLM/Local server were essential to the success of the project. **It also provided base line information on the number of access points that would be required for planned future expansion of system capabilities to support stock movement and physical inventory activities.**

Spectrum24™

**Site Survey Report for
AdvanTech**

Attention: Carol Fraser

Site Surveyed:

Army CIIP Facility
Fort Jackson, SC

Survey Date: August 31, 2001

Date of Report: September 7, 2001

Survey Performed by: Wayne Brown

For more information, please contact:

Account Manager: Wayne Brown

Telephone: 804-370-3381

Fax: 413-604-9586

Email: brownent@mediaone.net

This report remains the property of Computer Pro's
and may not be copied or distributed outside of the
customer's organization without written permission.

Report Contents

1.	RADIO SITE SURVEY OVERVIEW	24
2.	INSTALLATION CONSIDERATIONS	24
2.1.	NETWORK CONSIDERATIONS	24
2.2.	ELECTRICAL INSTALLATION GUIDELINES	24
2.3.	OTHER ENVIRONMENTAL CONSIDERATIONS	25
2.4.	GENERAL RECOMMENDATIONS	26
3.	WARRANTY OF COVERAGE	27
4.	SURVEYOR'S FINDINGS	28
5.	RADIO SITE SURVEY RESULTS	28
6.	EQUIPMENT PLACEMENT	30
7.	ATTACHMENT A – EQUIPMENT AND MATERIALS REQUIRED	36
8.	ATTACHMENT B – PROPOSED 11MB RF COVERAGE	
	ERROR! BOOKMARK NOT DEFINED.	

Radio Site Survey Overview

The radio site survey is a process by which test data is collected and used to determine hardware requirements needed to achieve **reliable RF propagation**. This enables use of the selected mobile devices in the areas required.

Data is collected by establishing two-way radio communications via a stationary and mobile unit at various points within a facility at **2.4 GHz**, utilizing the direct sequence method. Test units consisted of a Symbol Site-Survey utility with PC Card and a Spectrum24 Access Point with two external antennas.

Testing is performed with a free running program that constantly transmits, checks, and echoes data packets between the two units. Results are continuously displayed to provide instantaneous feedback. The mobile unit is moved throughout the area to be covered and results analyzed to determine the placement and quantity of equipment required to provide the required, reliable RF propagation zone. The focus is on acceptable packet receipt verses signal strength alone.

Installation Considerations

2.1. Network Considerations

Computer Pro's is not responsible for the integrity of the underlying network to which the Access Points will be attached, the impact of additional expansion, or increased stock levels.

Electrical Installation Guidelines

Symbol equipment is designed to work on generally available AC. However, like all electronic equipment, its performance is subject to degradation due to some commonly inherent or random electrical problems or disturbances.

This report in no way implies or warrants that electrical problems will not present themselves at some future time.

Electrical installation alternatives are listed as **most** desirable to **least** desirable.

1. Isolated ground circuit with an on-line, uninterruptible power supply (UPS) which will also act as a filter and surge suppresser.
2. Isolated ground circuit with a surge suppresser.
3. Dedicated circuit with a UPS.
4. Dedicated circuit with a surge suppresser.
5. Non-dedicated circuit with a UPS.
6. Non-dedicated circuit with a surge suppresser.

Items 1 through 4 are recommended for a Network Controller Unit if present in your configuration. Deviation from one of these options can cause loss of data being transmitted.

Configurations 5 and 6 are not recommended. Due to the nature of a non-dedicated circuit, which has open receptacles, the load and type of use cannot be predicted at the time of installation. While the current draw of the Access Points is minimal, other devices on the circuit can affect them. If it is absolutely necessary to have a non-dedicated circuit, we recommend that the circuit **not** support:

- Any hard wired devices
- Any devices with components intended or known to produce heat e.g., space heaters, laser printers, heat guns, soldering irons, photocopiers.
- Any devices prone to causing sudden sharp surges in the power line or which contain medium or large motors, e.g., electric staplers, refrigerators, floor cleaning equipment, air conditioners, fans, drills.
- Any single device drawing more than 20% of the rated value of the circuit
- Any combination of devices drawing more than 60% of the rated value of the circuit

In all cases the power to the Access Points must be unswitched and available 24 hours per day. It is recommended that the power never be provided from an Energy Management System.

The input power requirements are:

2mb FH Spectrum 24 Access Point: 115v ~0.4A or 230v ~0.2A

11mb DS Spectrum 24 Access Point: 115v ~1.0A or 230v ~0.5A.

Other Environmental Considerations

Apart from building configuration, interior usage, and electrical considerations, there are other elements that might impact the performance of your system and that should be considered in your choice of equipment. These include:

- Ambient temperature ranges
- Dust, dirt, humidity, and weather elements
- Planned usage, e.g. light commercial vs. industrial
- Location susceptibility to lightning and/or power fluctuations

General Recommendations

Access Points

- A 110 VAC surge suppresser outlet is recommended for Access Point power. The minimum requirements are 24 hour and clean. (See Electrical Installation Guidelines).
- For maintenance purposes, all Access Points and shelves could be mounted no more than 10 feet above finished floors, unless the customer directs another height. If Access Points and shelves are mounted above 10 feet, it is necessary to bring down the Access Point for service. In this case, the customer must bring the Access Points down when service is necessary, or provide a lift to maintenance personnel.

Feed Line/Data Cable

- Cabling should be run at ceiling level.
- Cabling should have a minimum three (3) foot clearance from existing AC power cables. **Do not install data cable runs in parallel within existing AC conduit.**
- Cable should conform to IEEE standards for the type of cabling specified.
- If an RF Control Unit or Gateway is to be used, allow an additional fifty feet (50) of cable for ease in any future relocation.

Antennas

- Maximum clearance should be maintained around antennas. Minimum recommended clearance is three (3) feet.

Special Notes

- To aid in locating the components of your Spectrum24 system once installed, keep a copy of this report in the computer room to be made available to any service technicians or electricians who may be doing work in your facility.

Warranty of Coverage

The Computer Pro's Site Survey results reported herein are warranted by the Seller for one (1) year from Site Survey Report date to provide 100% RF coverage in areas designated by your representative and marked in Attachment C, Site Plan. This warranty applies if the equipment enumerated therein is installed, configured, and tested per this report, and there are no changes to the facility's structure, parameters within the building, or addition of RF device types other than those surveyed for use. Such changes may create the need for an additional survey of the site for an additional fee. This warranty applies only to coverage for those RF device types specified herein; these reflect the device types designated on the Buyer's Site Survey Request form. This warranty is limited to RF coverage and does not provide any explicit or implied guarantee relating to other Network Design parameters; such as, but not limited to: optimum network speed, data throughput, fault tolerance, redundancy, etc.

If any defect within this warranty appears and Buyer notifies Seller within the warranty period, Seller shall take necessary steps to resolve the issue within a reasonable time frame. These steps will include arranging for and performing a new survey of the site. Should this re-survey find coverage shortfalls in the equipment specified, Seller will provide a revised Site Survey report and provide any labor necessary to move existing, and/or install additional, equipment as specified in the revised report. Buyer is responsible for the purchase and provision of any additional equipment required. Should this re-survey find that the system was not installed in accordance with the specifications shown in this Site Survey report, Seller reserves the right to invoice the Buyer at current rates for the time spent in troubleshooting the installation plus expenses.

Surveyor's Findings

This Army CIIP Facility will require 6 Access Points to provide 2mb, 5.5mb, and 11mb DS FH 2.4ghz RF coverage for 37,000sq'. Symbol Access Points, Model AP4121 will provide this service. Each Access Point will be powered via DC power (supplied power-over-ethernet). Equipment will be mounted, as noted in the "Equipment Placement Section" of this report, using a Symbol mounting bracket. All Access Points have been up-revved to the latest firmware v2.21-06, segmented by DS channel, and optimized for Symbol mobile unit RF activity.

The network topology will be a flat network dedicated to the RF project and one specific application. The wiring closet is located in the front office, "B8", in the corner of the facility.

Potential RF coverage areas include the entire building. However, Access Points may be placed as business processes and wireless applications dictate.

The survey was conducted based on the potential use of SPT1746, potential future use of other Symbol wireless handheld terminals, or VoiP Wireless Phones over the same backbone.

During the RF testing the bulk storage area was at 80% stock levels. As a result, we required a higher level of RF data packet success for the bulk storage area in an attempt to quantitatively counter non-peak stockage levels. There is no guarantee that this methodology will provide acceptable levels of RF coverage during 100% stock levels in the pallet warehouse.

Radio Site Survey Results

The mobile coverage needed at this site can be achieved through installation of a Spectrum24 radio system with 6 Access Points. This system needs to be installed per the considerations above and the attachments below.

- Attachment A: Hardware Required

- Attachment B: Proposed 11mb RF Coverage

Equipment Placement

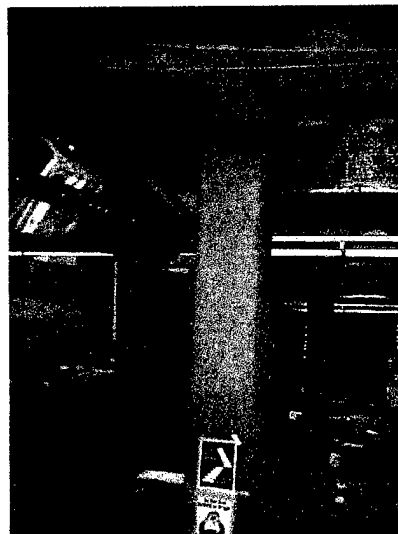
Access Point (UAP) # 1

Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration Yes	Mounting Height 20 Ft
Material Type <i>Concrete</i>	Mounted To <i>Column/Square</i>	Grid Location Section 9
AP Housing <i>AP Bracket</i>	Extended DC Power Yes	Channel: 1
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	CAT5 Distance: 65'
Notes: Mount at top of column at base of steps, section 9. Covers 40% of Unisex issue unit area.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Concrete</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height 20 Ft	Mounted To <i>Column</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height 23 Ft	Mast Length 1 Ft	Feed Line Cable Length 4 Ft
Notes: 2 antennas mounted on both sides of the AP approx. 3' apart on support beam above support column. Antennas should hang down past the bottom of the beam as much as possible.		



Access Point (UAP) # 2

Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration Yes	Mounting Height 20 Ft
Material Type <i>Concrete</i>	Mounted To <i>Column/Square</i>	Grid Location B24
AP Housing <i>AP Bracket</i>	Extended DC Power Yes	Channel: 6
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: 125'
Notes: Mount at top of column at the shipping desk. Covers 50% Unisex issue unit area.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Concrete</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height 20 Ft	Mounted To <i>Column</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height 23 Ft	Mast Length 1 Ft	Feed Line Cable Length 4 Ft
Notes: 2 antennas mounted on both sides of the AP approx. 3' apart on support beam above support column. Antennas should hang down past the bottom of the beam as much as possible.		



Access Point (UAP) # 3

Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration Yes	Mounting Height 20 Ft
Material Type <i>Concrete</i>	Mounted To <i>Column/Square</i>	Grid Location B34
AP Housing <i>AP Bracket</i>	Extended DC Power Yes	Channel: 11
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: 175'
Notes: Mount at top of column at front of Dock door at B34, just below the white pipes. Covers 50% Unisex issue unit area.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Concrete</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height 20 Ft	Mounted To <i>Column</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height 23 Ft	Mast Length 1 Ft	Feed Line Cable Length 4 Ft
Notes: 2 antennas mounted on both sides of the AP as far apart as possible on front of column, facing main warehouse, just below the white pipes.		



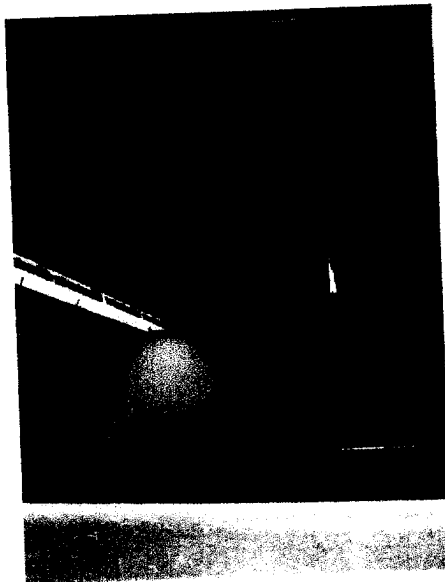
Access Point (UAP) # 4

Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration <i>No</i>	Mounting Height <i>8 Ft</i>
Material Type <i>Concrete</i>	Mounted To <i>Column/Square</i>	Grid Location <i>B22</i>
AP Housing <i>AP Bracket</i>	Extended DC Power <i>Yes</i>	Channel: <i>1</i>
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: <i>280'</i>
Notes: Mount at top of column in room B22, facing section 33. Covers 100% of Female issue unit area, Final fit, and Dressing room.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Concrete</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height <i>8 Ft</i>	Mounted To <i>Column</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height <i>10 Ft</i>	Mast Length <i>1 Ft</i>	Feed Line Cable Length <i>4 Ft</i>
Notes: 2 antennas mounted on both sides of the AP as far apart as possible on front of column, facing section 33.		



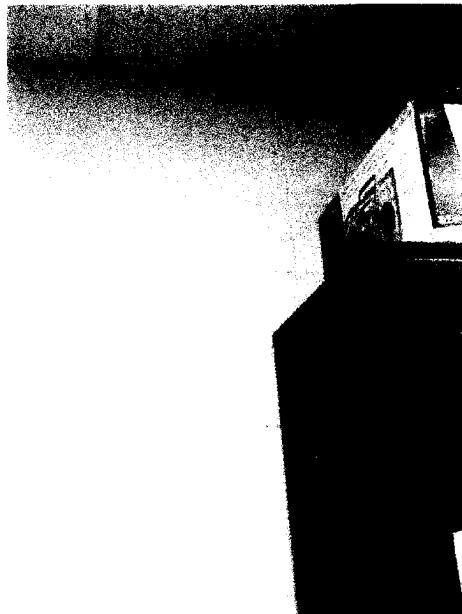
Access Point (UAP) # 5

Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration <i>Yes</i>	Mounting Height <i>8 Ft</i>
Material Type <i>Drop Ceiling</i>	Mounted To <i>Ceiling Grid</i>	Grid Location <i>B17</i>
AP Housing <i>AP Bracket</i>	Extended DC Power <i>Yes</i>	Channel: <i>11</i>
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: <i>170'</i>
Notes: Mount on ceiling grid just opposite the press rooms in the File room. Covers 100% of Alterations, Press, Accounting, File, Final Fit, Dressing rooms, and 50% of hall way.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Drop Ceiling</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height <i>8 Ft</i>	Mounted To <i>Ceiling Grid</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height <i>8 Ft</i>	Mast Length <i>1 Ft</i>	Feed Line Cable Length <i>4 Ft</i>
Notes: 2 antennas mounted on ceiling grid on both sides of the AP approx. 3' apart		



Access Point (UAP) # 6

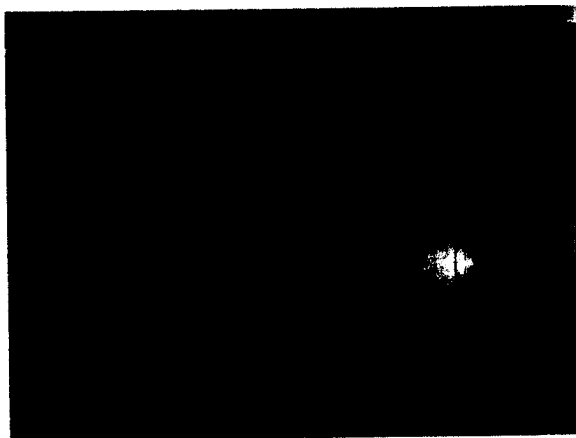
Hardware Mounting Information

Location Label Designated <i>No</i>	Wall Penetration No	Mounting Height 8 Ft
Material Type <i>Drop Ceiling</i>	Mounted To <i>Ceiling Grid</i>	Grid Location B1
AP Housing <i>AP Bracket</i>	Extended DC Power Yes	Channel: 6
Access Point# to HUB Front Office	Cable Type: <i>10 Base T</i>	Distance: 125'
Notes: Mount on ceiling grid just opposite the entrance door off of the main hallway. Covers 100% of Insignia, and Showdown. Covers 50% of hallway and Alterations. Covers 10% of Unisex issue unit.		

Antenna Mounting Information

Location <i>Interior</i>	Location Label Designated <i>No</i>	Lightning Protection <i>No</i>
Material Type <i>Drop Ceiling</i>	Antenna Type <i>H/P Diverse (4 ft)</i>	
Mounting Height 8 Ft	Mounted To <i>Ceiling Grid</i>	Alignment <i>Inverse Mounted</i>
Ceiling Height 8 Ft	Mast Length 1 Ft	Feed Line Cable Length 4 Ft
Notes: 2 antennas on mounted ceiling grid on both sides of the AP approx. 3' apart		

Mount inside this room



Attachment A – Equipment and Materials Required

Supplied by Customer

Unshielded Twisted Pair Category 5

	Description	Part Number	Manufacturer	Qty
1.	Modular Cord or Patch Cable	<i>By customer</i>	<i>By customer</i>	<i>6</i>

10BaseT

	Description	Part Number	Manufacturer	Qty
1.	CAT5 Ethernet Cabling	<i>By customer</i>	<i>By customer</i>	<i>940'</i>
2.	RF45 Connectors	<i>By customer</i>	<i>By customer</i>	<i>12</i>

Miscellaneous Materials (Nema Etc.)

	Description	Part Number	Manufacturer	Qty
1.	8 port Ethernet hub	<i>By customer</i>	<i>By customer</i>	<i>1</i>

Purchase from Computer Pro's ,

Spectrum24™ Antennas

	Description	Qty
1.	Single High Performance Access Point Antenna (3dBi) with 4 foot Plenum cable connection, and mounting hardware	12

DC Power

	Description	Qty
1.	24V Power Supply for extended DC for one Access Point	6
2.	US Power Cord for UAP Power Supply	6
3.	BIAS-T power-over-ethernet	6

Spectrum24™ Universal Access Point

	Description	Qty
1.	Spectrum24 - 2.4 GHz, 100 mW, 11mb Ethernet Access Point, without PSU or Antenna.	6

Mounting Brackets

	Description	Qty
1.	Mounting Bracket plate	6
2.	Drop Ceiling Mounting Bracket plate clips	4